RUBBER WORLD

AUGUST, 1942

Newsletter No. 8 *PUBLISHED BY RUBBER CHEMICALS DIVISION OF* DU PONT *AUGUST, 1942*

Neoprene Latex Users Urged to Evaluate New Type 571

To meet the greatly expanding demand for neoprene latex a new and improved manufacturing process has been developed which will enable us to increase its production considerably in existing equipment.

This new product which has been named Neoprene Latex Type 571 is similar to Neoprene Latex Type 57, and the latex chemist will find it an easy matter to adapt Neoprene Latex Type 571 on a production scale. To the user of neoprene latex, the development of Type 571 means two things:

(1) Larger quantities of neoprene latex will be available.

(2) The latex chemist and production man will have to make only slight adjustments in compounding and production technique from those employed with previously-used types of neoprene latex.

NEOPRENE LATEX TYPE 571 is a general-purpose latex. Like Type 57, it contains approximately 50% solids by weight and the two have approximately the same viscosity. The stability of Type 571 is of the same order as Type 57 in either the uncompounded or compounded forms. Articles may be made wholly or in part from this new latex by the usual processes of dipping, impregnation, spreading, spraying or molding by gelation. Cured films and coatings from properly compounded mixes of Neoprene Latex Type 571 exhibit practically the same tensile strength, hardness, permanent set and resistance to tear, to oils and water, and to aging as do vulcanizates of Neoprene Latex Type 57 compositions.

DIFFERENCES BETWEEN TYPE 571 AND TYPE 57— Neoprene Latex Type 571 differs slightly from Type 57 in color, odor, wetting properties and behavior on addition of the accelerators, Tepidone and Tetrone A. Slight modifications in compounding are required to give the best coagulating dip films.

COMPOUNDING— The basic formula recommended for use with Neoprene Latex Type 571 is the same as that currently recommended for use with Type 57. Using the basic formula as a starting point, special compositions may be readily developed to meet varying service conditions by the addition of the proper modifying agents, fillers and softeners.

Typical physical data on porous cup films made from standard compositions of Neoprene Latex Type 571 and Type 57 are compared in Table I below:

TABLE 1

Comparison of Stress-Strain Properties of Neoprene Latex Type 571 and Type 57

Air Cure Minutes	Stress in psi at elongation of			Tensile Strength at break	Elongation at break
at 140°C.	300%	600%	800%	psi	%
Films from Type 571					
15	125	1225	1475	3425	900
30	125	1250	1600	4125	940
60	150	1250	2200	4075	940
Films from Type 57					
15	150	675	1850	4025	1000
30	175	825	2400	4325	920
60	175	1025	3175	4425	870

AVAILABILITY— Neoprene Latex Type 571 will be produced in larger qunatities than other types previously manufactured, and will be supplied on order against allocations authorized by the War Production Board.

Manufacturers of products from neoprene latex are urged to evaluate Type 571. Samples and technical literature covering the compounding and processing of Neoprene Latex Type 571 are available to rubber manufacturers upon request. Ask for our informal Report BL-44 entitled "Neoprene Latex Type 571," on your company letterhead.

Through the Mill

MBT AND MBTS *are now available for immediate delivery from our plant at Carney's Point, New Jersey, or from our warehouses located at the following points:*

E. I. du Pont de Nemours & Co., (Inc.)
51 Sleeper Street
Boston, Massachusetts

E. I. du Pont de Nemours & Co., (Inc.)
% Cotter City View Storage Co.
1031 Sweitzer Avenue
Akron, Ohio

E. I. du Pont de Nemours & Co., (Inc.)
% Midland Warehouse & Transfer Co.
1521 South Western Avenue
Chicago, Illinois

E. I. du Pont de Nemours & Co., (Inc.)
5801 South Broadway
Los Angeles, California

E. I. du Pont de Nemours & Co., (Inc.)
235 Second Street
San Francisco, California

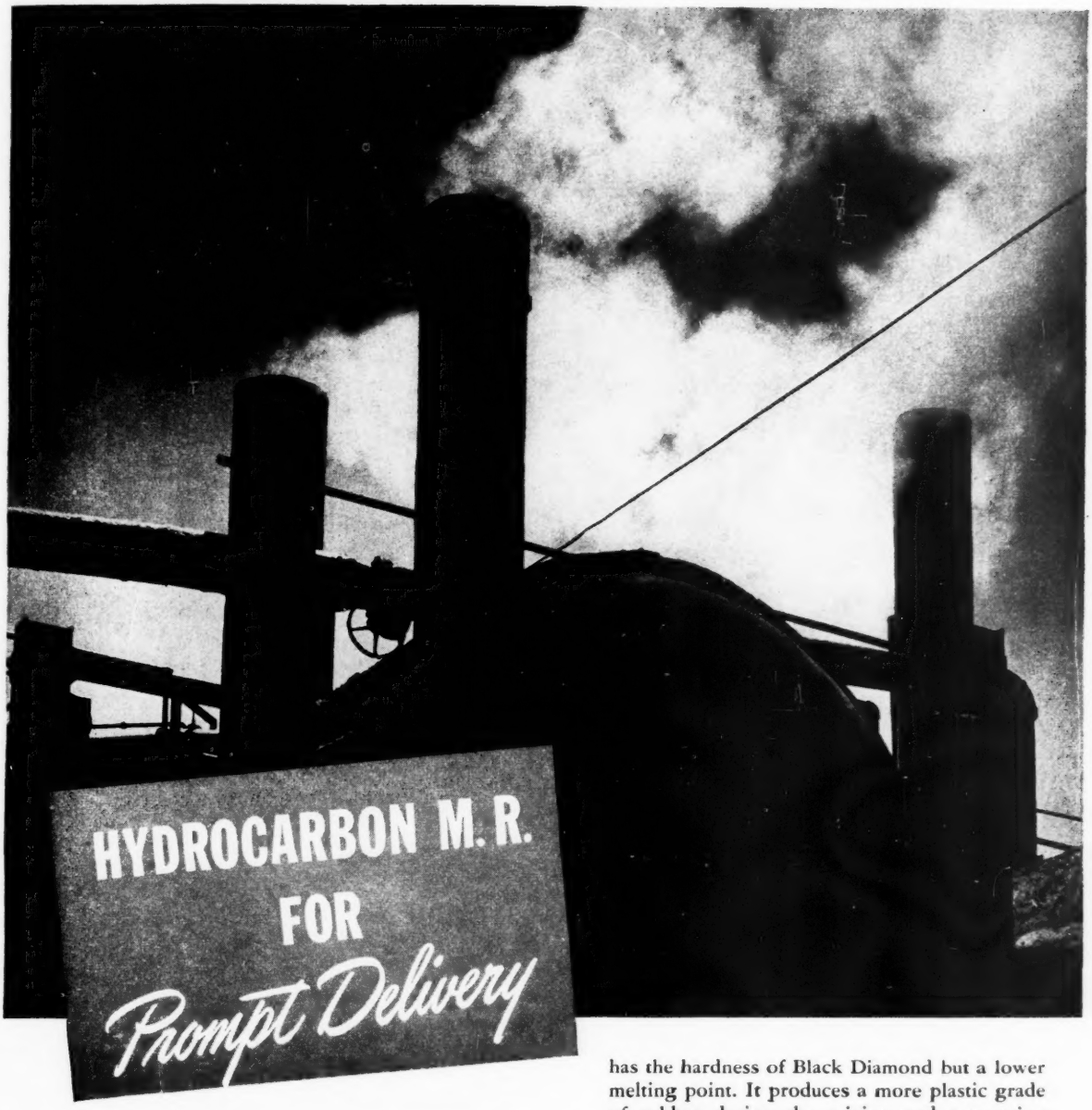
E. I. du Pont de Nemours & Co., (Inc.)
% Anchor Warehouse
New York and Olden Avenues
Trenton, New Jersey

BUGS! *Fungi germinate on rubber products under certain favorable conditions of temperature and humidity. During germination, the fungi generate harmful organic chemicals which cause premature deterioration of the rubber. A recent investigation indicates that Thionex is an effective fungicide in rubber, its effectiveness being proportional to the amount used. Details of this interesting series of tests will be gladly supplied to rubber manufacturers upon request. Neoprene and butadiene-acrylonitrile type synthetic were included in the series of compounds tested. Neoprene inherently resists fungus growth, probably because the presence of the chlorine radical, and therefore requires no additional fungicide. The butadiene-acrylonitrile synthetic seems to be similar to natural rubber in lack of resistance to fungi.*

RUBBER CHEMICALS DIVISION

Wilmington DU PONT *Delaware*

INDIA RUBBER WORLD, August, 1942, Vol. 106, No. 5. Published monthly by BILL BROTHERS PUBLISHING CORP. Printing office, Philadelphia, Pa. Editorial and advertising offices, 386 Fourth Avenue, New York, N. Y., U. S. A. Entered as second-class matter October 5, 1889, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.



If you are having trouble obtaining Hydrocarbon M. R. for use in your rubber products, let Wishnick-Tumpeer, Inc., meet your needs.

Our two modern, strategically located plants are producing at full capacity to meet vital war demands, but we have the extra facilities to fill your orders also.

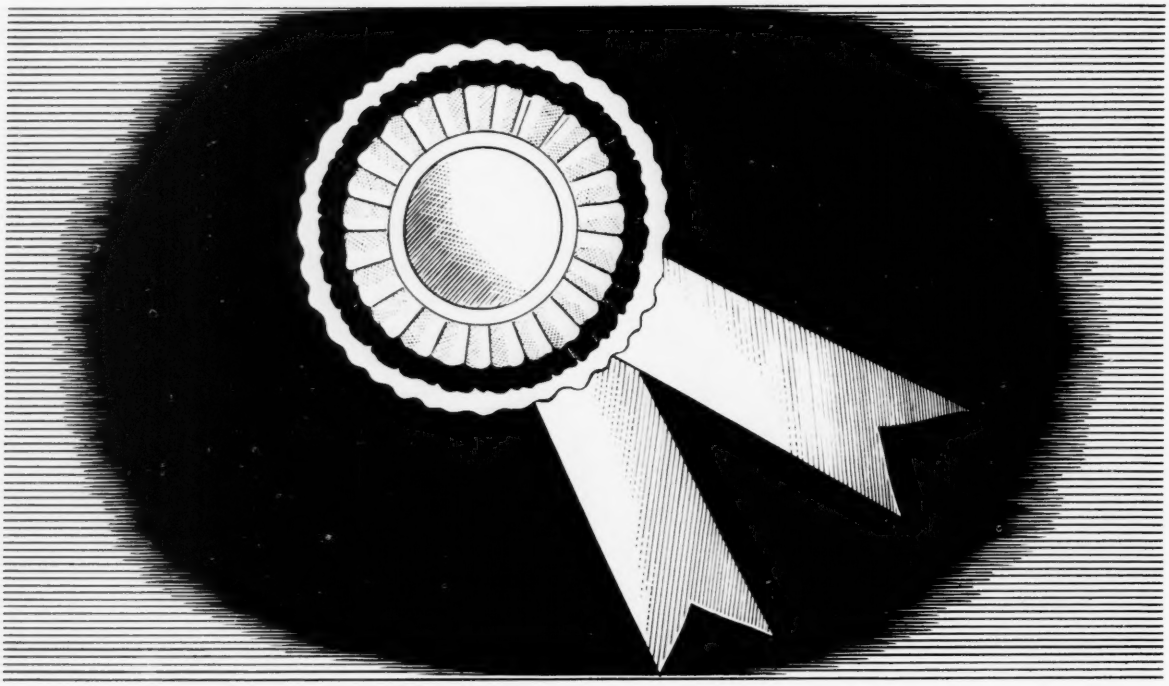
Two standard grades of Witco Hydrocarbon M. R., which cover a broad range of applications, are available for immediate delivery. One is Black Diamond, for highly loaded compounds. The other is No. 38, which has the hardness of Black Diamond but a lower melting point. It produces a more plastic grade of rubber during the mixing and processing operations. Both grades are offered in granular and solid forms. In addition to these we have other grades available and can develop new grades to meet your specific requirements.

Witco Hydrocarbons are produced by the most modern methods from carefully selected and tested materials. In addition to the cooperation of our experienced service staff, we offer you the facilities of our research and product development laboratory. Write, phone or wire today.

WISHNICK-TUMPEER, INC.

Manufacturers and Exporters

New York, 295 Madison Ave. • Boston, 141 Milk St. • Chicago, Tribune Tower • Cleveland, 616 St. Clair Ave., N. E.
Witco Affiliates: Witco Oil & Gas Company • The Pioneer Asphalt Company • Panhandle Carbon Company
Foreign Office, London, England.



To merit distinction

In nearly every field one product stands out. One product is "first." And this distinction is usually based on TIME. One manufacturer adopted a new and better idea "first."

Where do these new and better ideas come from? In product finishing many of them have originated in our own research laboratories . . . produced by experienced engineers to meet the specific requirements . . . or frequently imaginative aspirations . . . of hundreds of manufacturers like yourself.

Many products with which you are familiar are finished by Stanley . . . products which are "firsts" in their fields. A new and better finish can cut your finishing time, reduce your finishing cost . . . can help make your product, too, a "first."

But remember that distinction is based on TIME. First products must be "first."

Your inquiry incurs no obligation. Address Department "H"

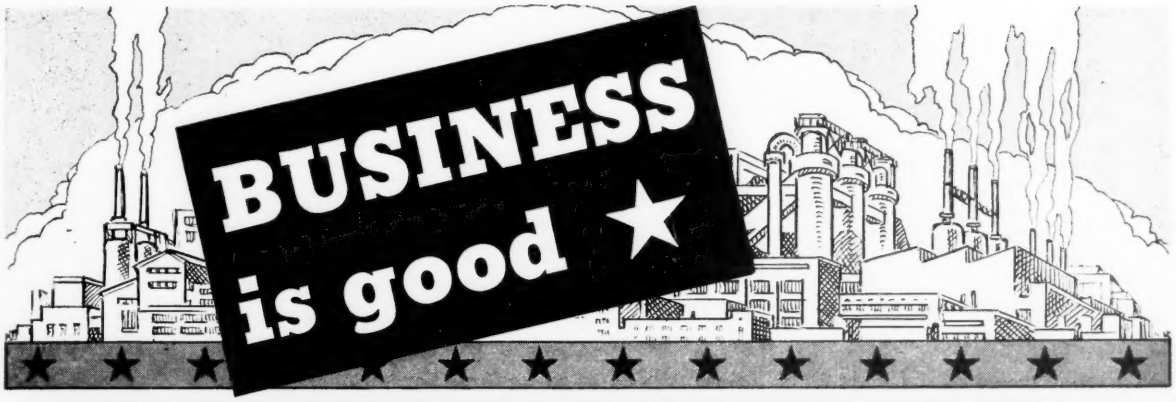
STANLEY

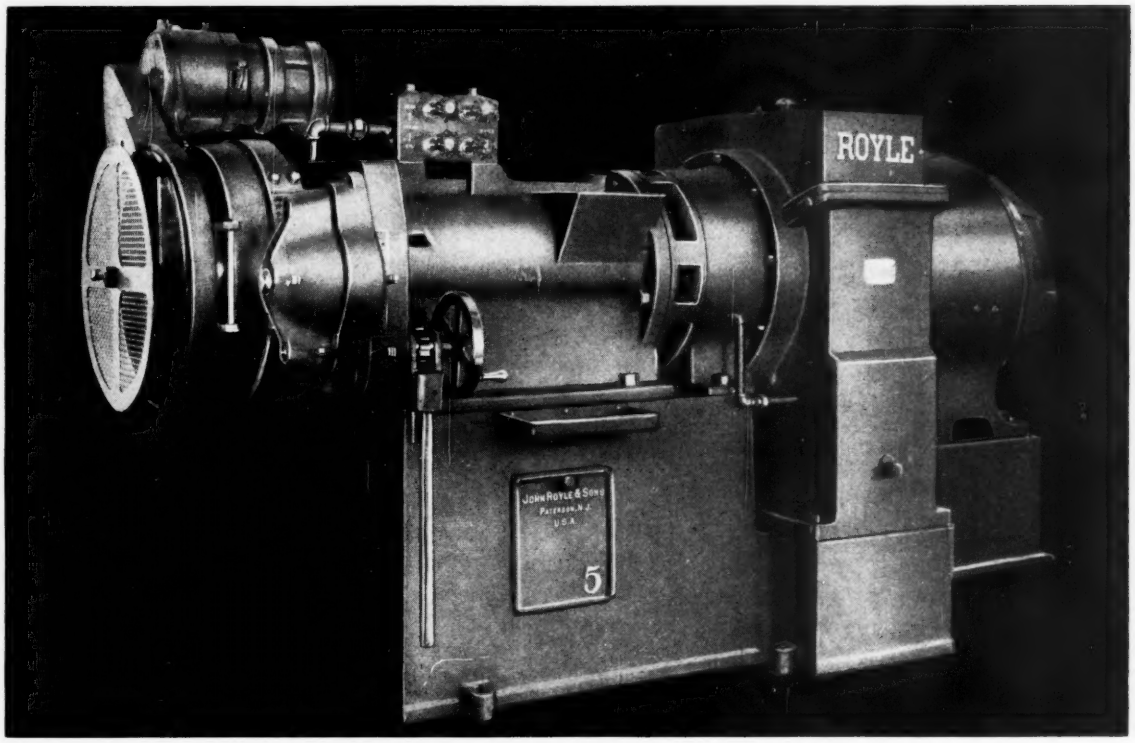
THE STANLEY CHEMICAL CO.

EAST BERLIN CONNECTICUT

Lacquers · Enamels · Synthetics · Japans

A SUBSIDIARY OF THE STANLEY WORKS, NEW BRITAIN, CONN





A PRODUCING STRAINER! THE ROYLE 8½" WITH MANUALLY-OPERATED BREECH LOCK HEAD

In factories throughout the country, chimneys belch black smoke and giant machines roar as raw materials are converted into goods that make America strong.

★ — **BUSINESS IS GOOD** because industry is bustling to produce the goods and machines required to build guns, planes and ships, vital to national defense.

John Royle & Sons is typical of America today as she strains to meet the quickening demand. Our business is good because of the increasing demand for the kind of quality and service we give. To the limit of our facilities, top service is always at your call.

John Royle & Sons *Since 1855*

ROYLE PATERSON N J

AKRON, J. C. CLINEFELTER • • LONDON, JAMES DAY (MACHINERY) LTD.

ROYLE'S 62 ND. YEAR OF EXTRUDING MACHINE MANUFACTURE

Have you considered

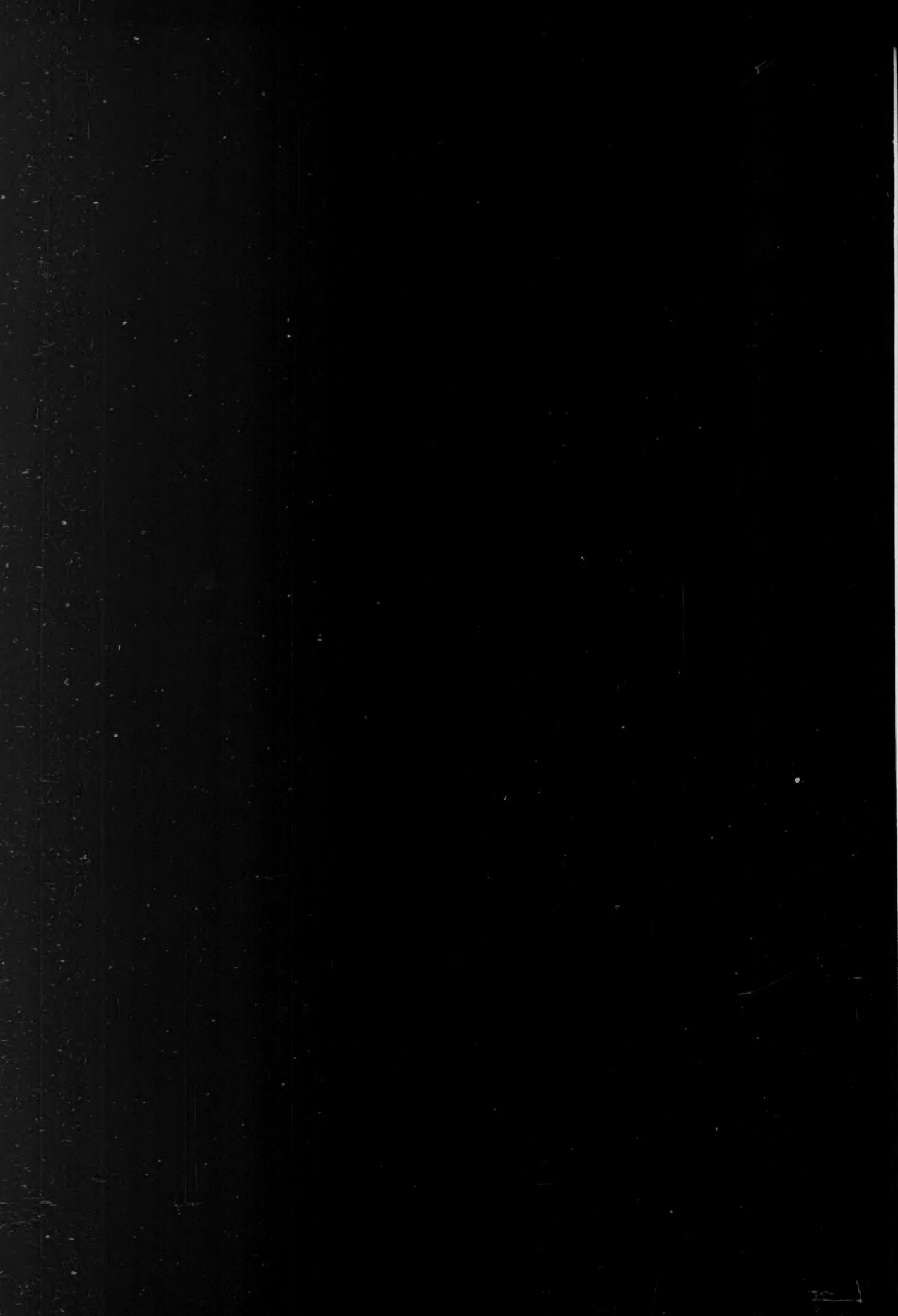
DISPERSITE*

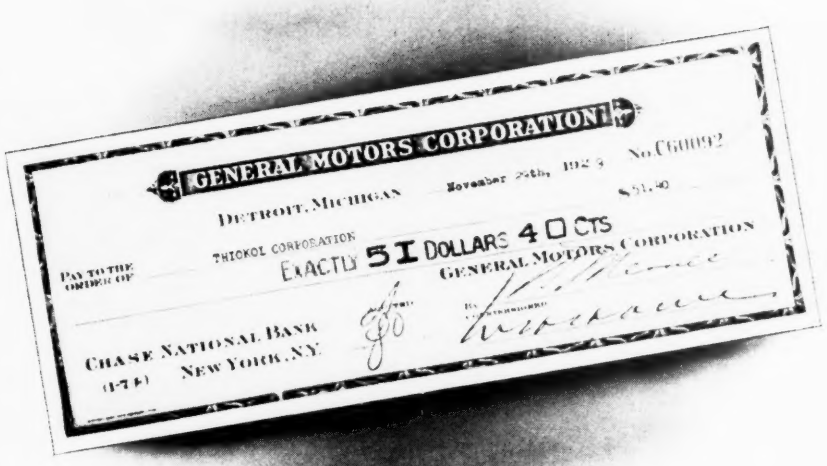
The water-dispersion alternate for Latex made from reclaimed rubber is available for war products and essential civilian uses.

* For many applications, Dispersite is being used commercially to replace Latex. It may help to solve *your* problem. Trade mark is registered.

Dispersions Process, Inc.

ROCKEFELLER CENTER NEW YORK





First Sale of a Thiokol Product

Synthetic Rubber Development is Thirteen Years Old

ON November 29, 1929, the then young Thiokol Corporation received payment from General Motors for the first shipment of Thiokol* synthetic rubber. That transaction was the first of the great synthetic rubber industry that is to fast free America from dependency on imported rubber.

Today Thiokol* synthetic rubber in self-sealing bullet-proof tanks, protective coatings, hose and many other products is helping us win the War. Tires with retreads of Thiokol* keeping war workers' automobiles rolling are the most recent achievement of our thirteen years of synthetic rubber development.

In current production (or in planning future products that will utilize synthetic rubber) be sure to discuss with Thiokol engineers the striking possibilities of Thiokol*—America's first synthetic rubber. A letter or call will bring a quick response. Thiokol Corp., Trenton, N. J.

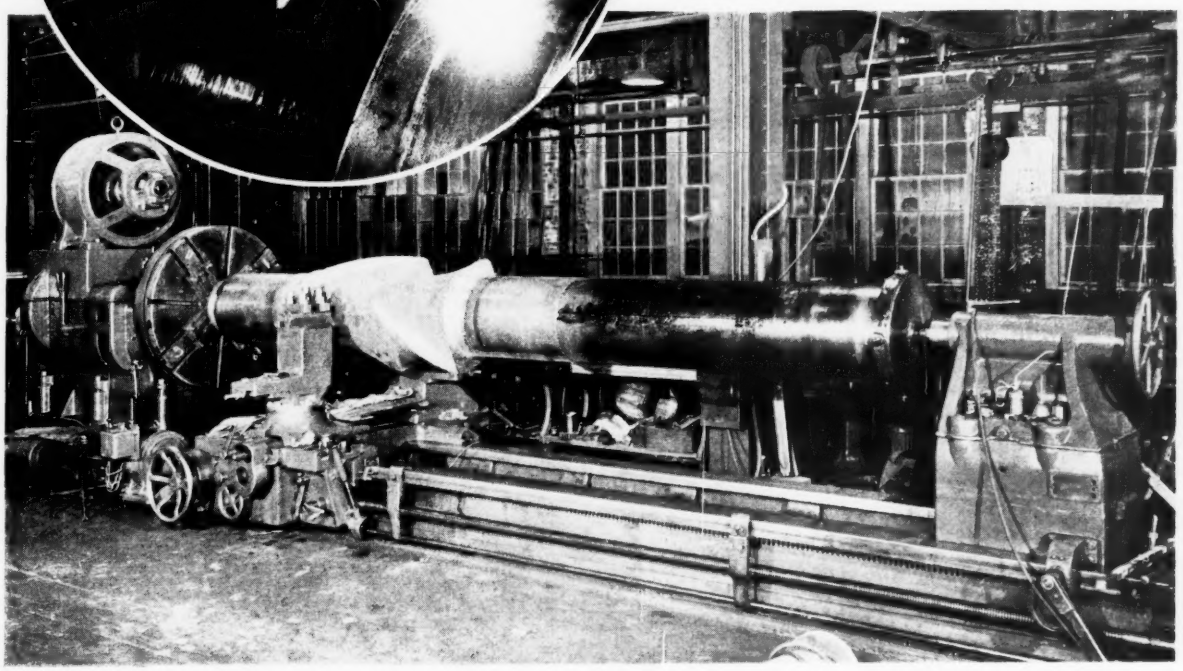
"AMERICA'S FIRST"

Thiokol

SYNTHETIC RUBBER

*Thiokol Corporation trade mark reg. U.S.

...Skill for "Blitz" Production



From beginning to end Interstate skill with the proper equipment marks the certainty of maximum efficiency when the Banbury goes back to work on your production line . . . We specialize on this one phase of the Rubber Industry's production program — Repairing, Re-building, Re-designing, Hard-Surfacing Banburys to keep up with the needs of "blitz" production . . . We are working 24 hours a day to make Banburys faster and more efficient . . . If you have a Banbury problem write, wire or phone us today.

SERVING THE IWS RUBBER INDUSTRY

INTERSTATE WELDING SERVICE

Main Plant: 914 Miami Street . . . AKRON, OHIO . . . Phone: JE 7970

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

READER INTEREST MAKES ADVERTISING PAY

ADVANCE SOLVENTS & CHEMICAL CORPORATION
ORGANIC AND INORGANIC CHEMICALS
245 FIFTH AVENUE
NEW YORK, N. Y.

TELEPHONE
ASHLAND 4-7055

January 30, 1942

RECEIVED
FEB 2 1942
I. R. W.

Mr. E. V. Osberg
India Rubber World
420 Lexington Ave.
New York, New York

Dear Mr. Osberg:

Thank you very much for the tear sheets on patents from the last issue of "India Rubber World".

I have noticed that you have expanded the patent abstracts dealing with rubber, and we find this of great value for now we can tell what the patent is about and can order it if the abstract is interesting.

These abstracts form a valuable part of your magazine, and you are to be congratulated on this expansion.

Yours very truly,

ADVANCE SOLVENTS & CHEMICAL CORPORATION

GM:JH

G. Mack

Prince Rubber Company, Inc.

885 NIAGARA STREET — BUFFALO, NEW YORK

Manufacturers' Representatives

March 3, 1942

RECEIVED
MAR 4 1942
I. R. W

India Rubber World
% Bill Brothers Publication Corp.
420 Lexington Avenue
New York, New York

Gentlemen:

You have probably received many comments on the new arrangement of the articles in India Rubber World and we wish to add ours for we really do appreciate the new arrangement.

In order to make the information contained in your magazine more readily accessible to our Salesmen, we practically tear the book to pieces, filing the various articles under groupings, such as compounding under the various rubber products, under synthetic rubber, under characteristics of rubber, and etc., and the way that you end up each article on one or two pages and fill in the rest of the page with incidental information is just grand, because formerly in going into the back of the magazine to get the clipping for a complete article, we found that we would cut out some information for some other article whichwe wished to keep the information on, with the result in some instances where the information was vital, we had to look in the index, and others, the information was entirely destroyed.

We hope that you will continue in this fine manner and that others will see the value of combining articles completely so that articles may be cut apart for easier filing of information.

Very truly yours,

PRINCE RUBBER COMPANY, INC.

BY L. T. Kazmer

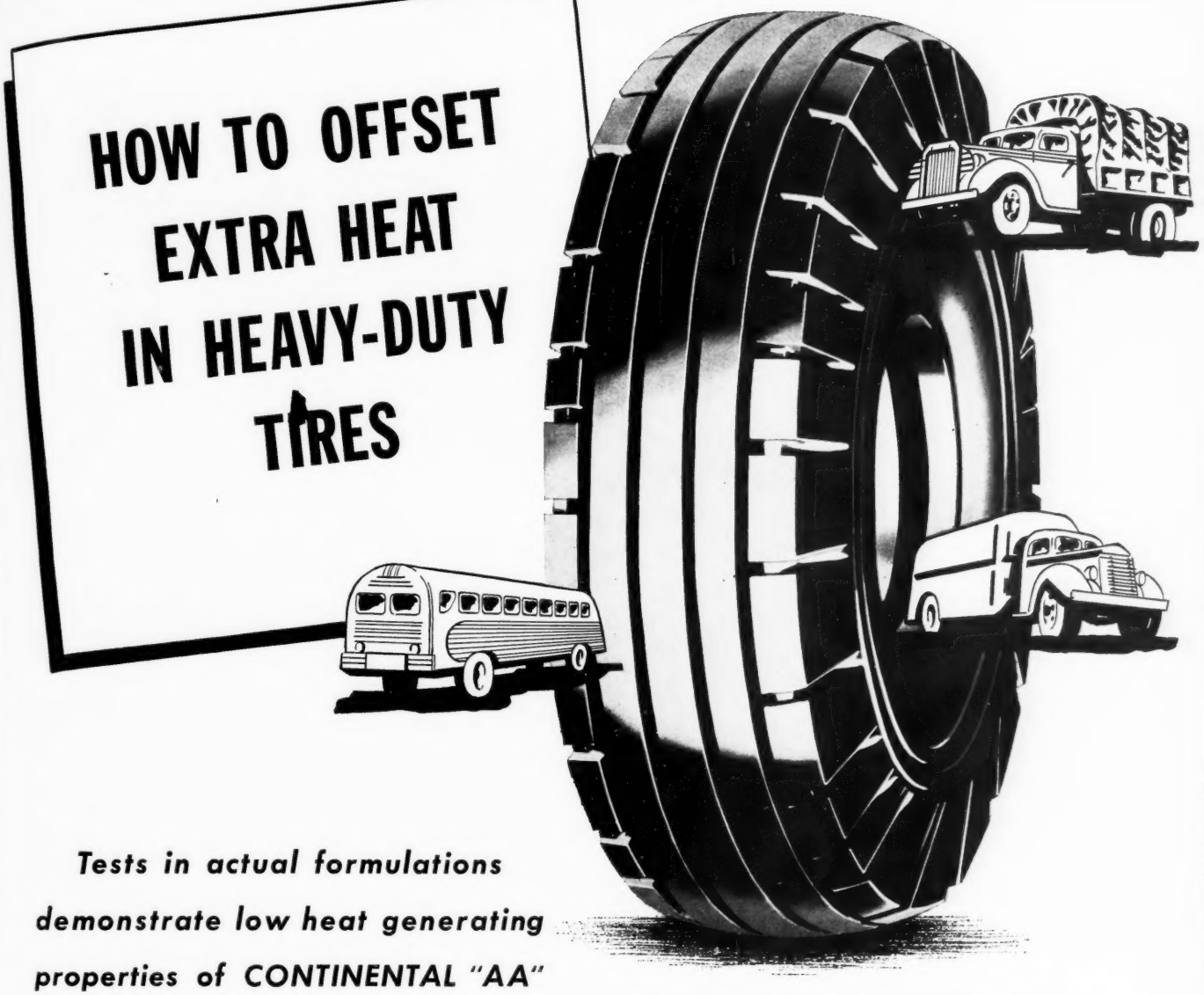
LTK:VCF

LARGEST PAID CIRCULATION AND ADVERTISING VOLUME IN THE INDUSTRY

INDIA RUBBER WORLD

386 FOURTH AVENUE — ESTABLISHED 1889 — NEW YORK, N. Y.

HOW TO OFFSET EXTRA HEAT IN HEAVY-DUTY TIRES



Tests in actual formulations demonstrate low heat generating properties of CONTINENTAL "AA"

The cause of most heavy-duty tire failure has long been the heat generated during high speed operation. Today you can offset this *extra* heat with Continental "AA"—a new type black. Test after test in actual formulations has proved conclusively that Continental "AA" contributes *less* to heat generation than do standard blacks. Specially processed, Continental "AA" maintains just the right balance between wear resistance in the tread compound and heat generation in the tire itself. In military, truck and bus tires—tires that must "stand up" in the hottest climates and under the severest operating conditions . . . Continental "AA" fills a vital need.

CONTINENTAL "AA" IS EASIER PROCESSING, TOO!

In still another respect, Continental "AA" is superior to standard grades of black used in passenger car tires. It's easier *processing*. And rigid laboratory control methods insure the same high quality characteristic of all Continental Blacks, whatever the grade. Discover how completely Continental "AA" meets *your* requirements—write for samples today.

TRY CONTINENTAL "AA" IN YOUR BUNA S FORMULATIONS

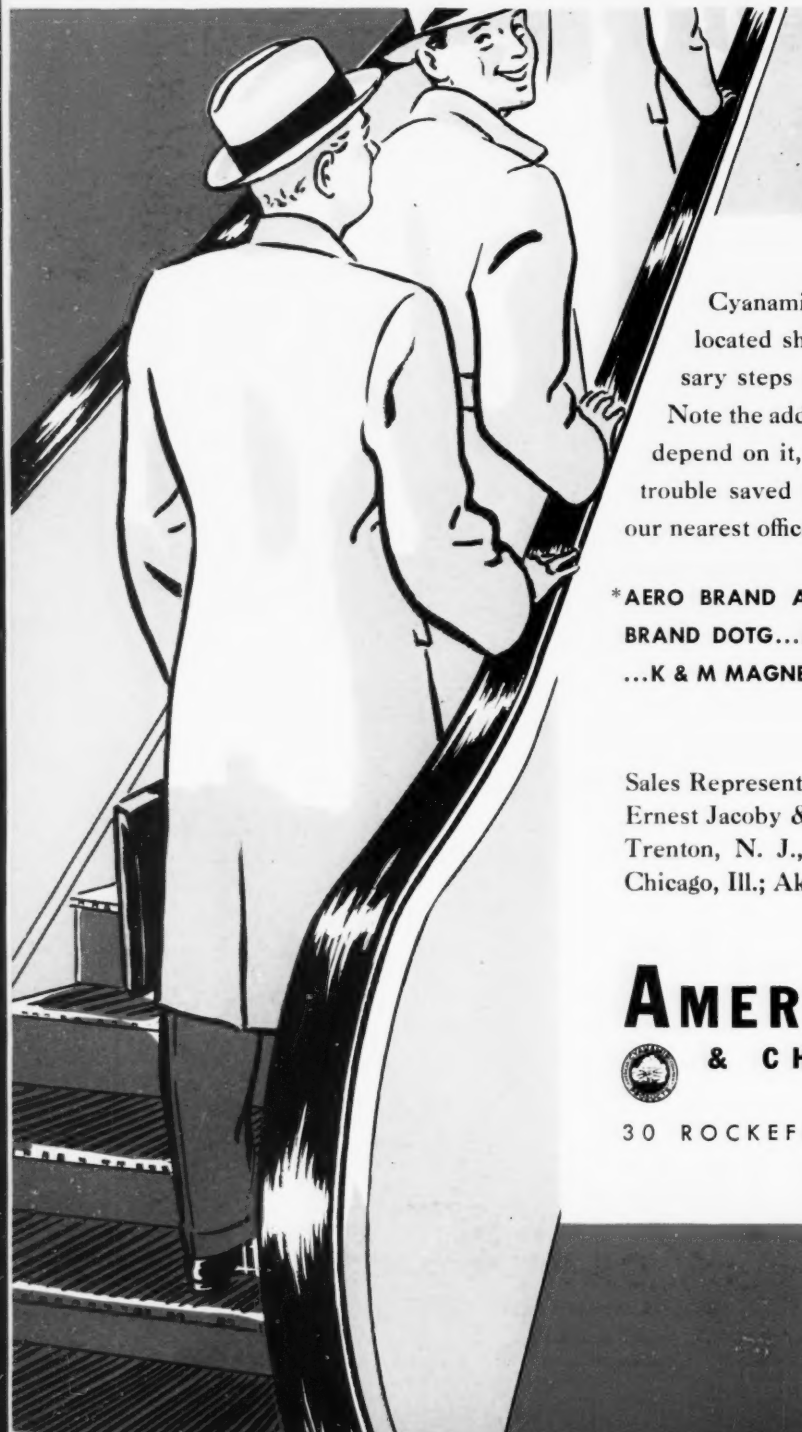
If you are experimenting with this type synthetic rubber, by all means investigate the characteristics of Continental "AA". Let us send additional samples for your Buna S formulations.

Continental **CARBON COMPANY**

295 MADISON AVENUE • NEW YORK, N. Y.

Akron Sales Office: Peoples Bank Building, Akron, Ohio • SALES REPRESENTATIVES: Ernest Jacoby & Co., Boston, Mass. • Marshall Dill, Los Angeles and San Francisco, Calif.

SAVE YOURSELF UNNECESSARY STEPS



Cyanamid's warehouses are situated at conveniently located shipping points—to save you time and unnecessary steps in obtaining chemicals for rubber production. Note the addresses of our sales representatives below. And depend on it, Cyanamid controlled quality means time and trouble saved for you in processing, too. Get in touch with our nearest office for—

***AERO BRAND ACRYLONITRILE... AERO BRAND DPG... AERO BRAND DOTG... AERO AC 50... AERO BRAND RUBBER SULPHUR ...K & M MAGNESIUM OXIDE... K & M MAGNESIUM CARBONATE**

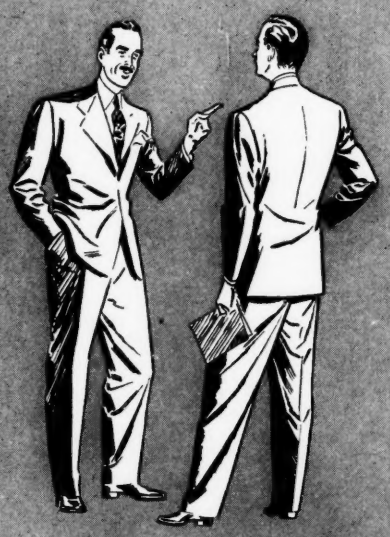
**Reg. U. S. Patent Office*

Sales Representatives to the Rubber Industry and stock points: Ernest Jacoby & Company, Boston, Mass.; H. M. Royal, Inc., Trenton, N. J., and Los Angeles, Cal.; Herron & Meyer, Chicago, Ill.; Akron Chemical Company, Akron, Ohio.

AMERICAN CYANAMID
& CHEMICAL CORPORATION

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA · NEW YORK, N. Y.



If you're interested in

faster **production**

you'll want Southwark Hydraulic Presses

Southwark is the name to look for when you need dependable plastic molding presses, for in back of every plastic piece stands the quality of the press which formed it. Southwark-built presses are noted for high-quality performance—they combine accuracy with versatility.

If you are interested in cutting down molding time, shortening time-cycles, look to Southwark Presses for the answer. With well-built molds, plastic products molded on Southwark Presses require less finishing, there are fewer fins and flashes to be removed, fewer rejects because the presses are rigid, the platens well guided.

All these features, characteristic of Southwark Molding Presses, point to one word—economy. You can save on material because close tolerances on thickness can be held, the per piece weight of the product can be kept down, costs will be lower.

Southwark hydraulic molding presses have proven their reliability, have shown the way to reduced production costs, have helped many a company do a better job—more economically.

BALDWIN

Southwark

DIVISION OF THE BALDWIN LOCOMOTIVE WORKS • PHILADELPHIA

August, 1942

VOLUME 106 NUMBER 5

A Bill Brothers Publication

INDIA RUBBER WORLD

CONTENTS

DEPARTMENTS

MARKET REVIEWS

STATISTICS

ARTICLES

Published monthly by Bill Brothers Publishing Corp., 386 Fourth Ave., New York, N. Y. Chairman of Board and Treasurer, Raymond Bill; President and General Manager, Edward Lyman Bill; Vice Presidents, Randolph Brown, B. Brittain Wilson.

A BILL BROTHERS PUBLICATION

Subscription price—United States and Mexico, $3.00 per year; all other countries $4.00. Single copies thirty-five cents. Other Bill publications are *Premium Practice*, *Rug Profits*, *Sales Management*, *Soda Fountain*, *Grocer-Graphic*, and *Tires*.

INDIA RUBBER WORLD

Published at 386 Fourth Avenue, New York, N. Y.

Volume 106 **New York, August, 1942** **Number 5**

Studies in Compounding Guayule Rubber[1]

E. A. Hauser[2] and D. S. le Beau[2]

WITH the loss of the Malayan Peninsula and the Dutch East Indies the United States and her Allies have been deprived of about 97% of their crude rubber supply. This fact explains in part the revived interest in guayule rubber. Of all the known rubber-bearing plants besides *Hevea*, it is the most promising from the yield point of view and because it can be cultivated within our own borders.

Although considerable literature pertaining to plant biological aspects of guayule and its cultivation has been accumulated, very little has been published so far on the processing properties of guayule rubber and the qualities of articles made therefrom. This situation is even more deplorable because of the fact that the few available publications are contradictory and not directly comparable because different types or grades of guayule rubber have been used.

It is the authors' opinion that a last-minute rush for information on the processing properties of guayule must be avoided if we are to make the best use of this potential new type of crude rubber when it will be available in sufficient quantities to make itself felt in our present and future rubber program. Therefore systematic research seems essential now rather than later.

Deresinified Domestic Guayule Pure Gum Compound Used

To avoid unnecessary complicating factors and to facilitate comparison with the processing and mechanical properties of *Hevea* rubber (standard prime ribbed smoked sheet) it was decided to use, at least for the first part of this investigation, a simple pure gum stock. The following formula, unless otherwise indicated, was used throughout this investigation. The rubber was commercially available deresinified guayule obtained from the Salinas, Calif., plant of the Continental Rubber Co. of New York. The resinous matter still present in this product amounted to 6%.

100 parts deresinified guayule
5 parts ZnO (St. Joe, black label)
1 part Captax
3 parts sulphur
1 part stearic acid

No antioxidant was added to this test compound since deresinified guayule already contains a sufficient quantity.

This formula was decided upon after stepcures at 290° F. had shown that the compound containing three parts sulphur exhibited the best overall curing characteristics. (Table 1.)

TABLE 1

Min. of Cure	% Total Sulphur	% Free Sulphur	% Combined Sulphur	% Acetone Extract	% Acetone Extract Corrected	% Elongation at Break	Tensile Strength Lbs./Sq. In.
5	3.24	1.82	1.42	8.13	6.3	835	1700
15	3.24	.63	2.61	6.83	6.2	790	1795
30	3.24	.28	2.96	6.41	6.1	790	1505
60	3.24	.25	2.99	5.85	5.6	780	1095

These figures show a few interesting facts. The compound is comparatively fast curing, exhibiting a pronounced drop in tensile properties after 15-minute cure. Sulphur combination is very rapid at the start. Elongation remains practically constant, even after the maximum tensile strength has been reached.

Effect of Rubber Breakdown on Tensile

During milling (using a lukewarm mill 100° F.) it was noticed that the breakdown of guayule rubber was much faster than that of smoked sheet, and it was considered possible that this rapid breakdown might be largely responsible for the low tensile properties obtained after vulcanization.

Since it is well known that the actual breakdown of rubber during milling decreases with increasing mill temperature, it was decided to run a second series of tests using the same compound, but breaking the guayule down on a mill heated to 140° F. Time of compounding as well as the size of the batch and the mill gap was kept constant throughout. The results are shown in Figure 1 in comparison with those discussed above.

It is evident that the maximum tensiles have been

[1] This paper is based largely on data taken from the Master of Science thesis of H. M. Zimmerman, carried out in the Chemical Engineering Department, M. I. T. (1942), and from results obtained by R. M. Haden, Continental-Mexican Rubber Co., during his short stay at M. I. T. in May, 1942.

[2] Massachusetts Institute of Technology, Cambridge, Mass.

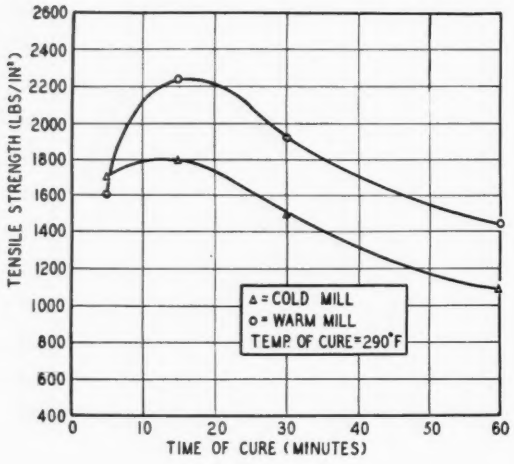


Fig. 1

noticeably increased. There is no change in the rate of cure, and prolonged vulcanization also results in an appreciable drop of tensile properties. The rate of sulphur combination remains unchanged; whereas the acetone extract is definitely lower in this series.

Effect of Curing Temperature

Inasmuch as a breakdown of rubber can be achieved by heat as well as by mechanical treatment (milling), it was decided to reduce the curing temperatures in the next series of tests. The results are given in Figure 2.

It is evident that the curing temperature has a very decided influence on the vulcanization characteristics and physical properties of the compound. As the lowest curing temperature resulted in an extremely slow vulcanization, it was decided to use a temperature of 270° F. and a mill temperature of 140° F. for further work.

Effect of Increased Stearic Acid

We are greatly indebted to H. Boucher, chemist of the Continental-Mexican Rubber Co., for pointing out in a discussion with one of the authors that improved tensiles can be obtained by increasing the amount of stearic acid to 1.5 parts per 100 parts of guayule. This point was substantiated by a series of experiments in which the amount of stearic acid was gradually increased to as much as five parts per 100 parts of guayule.

Figure 3 shows the results obtained with the standard compound by varying the amount of stearic acid from one part to four parts. The compound containing five parts of stearic acid shows a pronounced drop in tensiles and therefore has been omitted. Two points of importance are evident. The rate of cure is noticeably increased if the amount of stearic acid is raised to 1.5 parts. Further increase up to four parts does not appreciably change the rate of cure, but the tensile strength continues to increase; whereas the elongations of the cured stocks decrease with increasing amounts of stearic acid.

Further Experiments to Determine Best Curing Conditions

An interesting phenomenon is revealed when the amount of stearic acid and the per cent. acetone extract (corrected for the presence of free sulphur) of the cured compounds are correlated (Figure 4). The figures for the acetone extract pass through a definite minimum with two parts of stearic acid. This result combined with the previously discussed improvements in tensile properties with increasing amounts of stearic acid seems to indicate that a certain amount of the acid is used up before it affects the vulcanization of guayule rubber.

Inasmuch as compounds containing low amounts of stearic acid result in poor tensiles and as it has also been found that the addition of small amounts of guayule resin to standard smoked sheet compounds drastically reduces their tensile properties,[3] it is most probable that the stearic acid reacts with some constituent of the resin forming an acetone insoluble product. The results furthermore seem to indicate that this resin constituent inhibits vulcanization. Preliminary experiments, furthermore, indicate the possibility of a resin-sulphur combination in preference to the rubber-sulphur combination in the early stages of cure. This and the added fact that guayule rubber seems to be decidedly more sensitive to thermal breakdown suggest the importance of high speed-low temperature cures. To test this assumption the following compounds were prepared:

A	B
100 parts guayule rubber	100 parts guayule rubber
2.5 parts S	3 parts S
5 parts ZnO	5 parts ZnO
4 parts stearic acid	4 parts stearic acid
1.5 parts Captax	1 part Captax
0.6 part DPG	0.2 part DPG

TABLE 2

	Min. of Cure	(Lbs. Sq. In.) Tensile at Break	% Elongation at Break
Compound A (curing temp. 250° F.)	20	4000	690
	30	3680	670
	40	3480	640
Compound A (curing temp. 230° F.)	25	3970	720
	32	3980	690
Compound B (curing temp. 270° F.)	5	3200	820
	10	3600	770
	15	3440	720

It is evident that the tensile properties have again been increased and that low curing temperatures are beneficial.

[3] This statement is taken from data contained in Peter Smolka's Master of Science thesis, M. I. T. (1942). A comprehensive publication of the influence of guayule resin on vulcanization is in preparation.

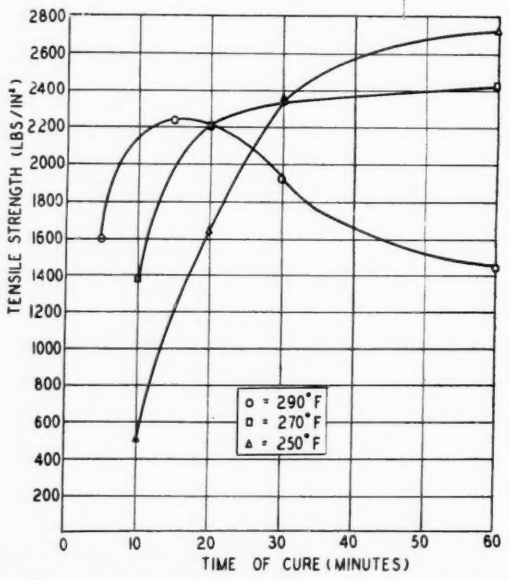


Fig. 2

The data obtained with Compound A indicate that the combined accelerators have also resulted in an increased rate of cure, but further work is necessary to ascertain the actual maximum. Likewise, the results of Compound B call for a repetition at lower curing temperature.

Three more compounds were prepared to study the effect of stearic acid in a stock containing Tuads as accelerator.

	Compound C	Compound D	Compound E
Guayule (deresin.)	100 Parts	100 Parts	100 Parts
S	3 Parts	3 Parts	3 Parts
ZnO	5 Parts	5 Parts	5 Parts
Stearic acid	2 Parts	3 Parts	4 Parts
Tuads	0.8 Part	0.8 Part	0.8 Part

The results are given in Figure 5. They seem to indicate that the amount of stearic acid necessary to give maximum tensile properties in Tuads accelerated compounds is only three parts per 100 parts of guayule rubber and that a curing temperature of 270° F. is too high or that the amount of accelerator should, moreover, be reduced.

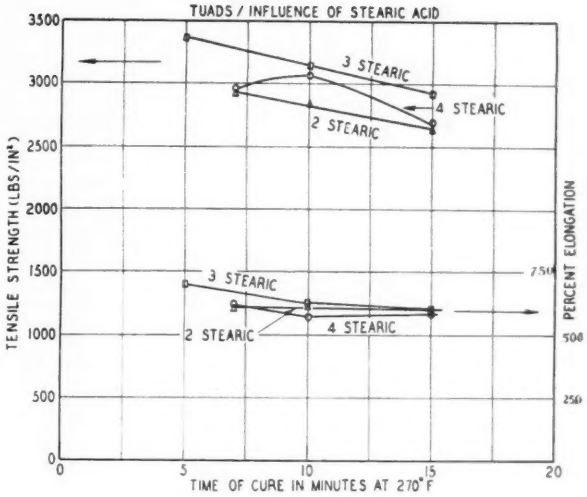


Fig. 5

Conclusions

The authors want to state that they do not consider the data herewith presented by any means complete. However they considered it their duty to publish the data so far available at this time to show that guayule rubber may not be processed, compounded, or vulcanized by standard *Hevea* rubber methods if maximum physical properties are desired, and that with appropriate compounds, commercially deresinified guayule can result in cured stocks which are equivalent in their physical properties to those which are prepared from *Hevea* rubber. Further results of work now in progress will be reported as soon as possible.

The authors are greatly indebted to the Continental Rubber Co. of New York and the Continental-Mexican Rubber Co. for use of the data obtained by Mr. Haden and for the supply of the deresinified guayule used in this work.

Bibliography

J. A. Doering, *Ind. Eng. Chem.*, 26, 541-43 (1934).
R. E. Morris, R. R. James, and T. A. Werkenthin, India Rubber World, 105, 6, 565-69 (1942).
D. Spence and C. E. Boone, Bureau of Standards Tech. Paper, No. 353, Sept. 23, 1927.

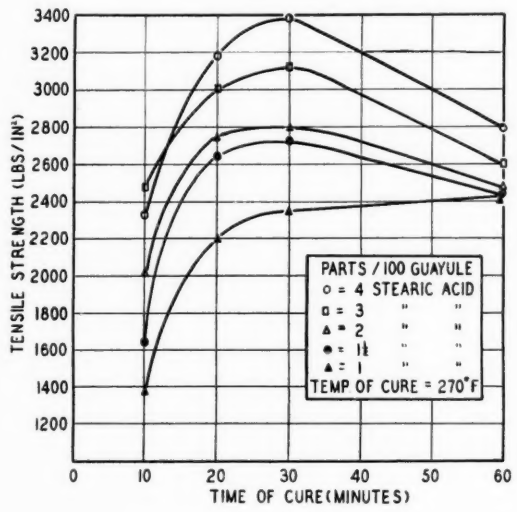


Fig. 3

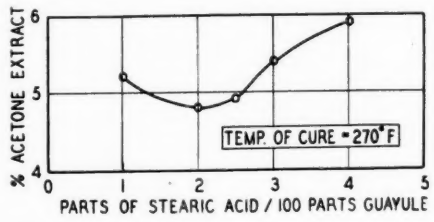


Fig. 4

Substitutes for Rubber

Colonial "V" Plastics, products of the Chemical Division of Colonial Alloys Co., are said to have a wide range of uses as substitutes for rubber and other materials. There are three types, and all are available in a variety of sizes in threads, tubes, rods and sheets, and extrusions from flexible to rigid grades. All types are opaque and translucent, while Types II and III, furthermore, are also transparent.

All types are reported resistant to oils, gasoline, acids, and alkalies; and, in addition, Type I, to organic solvents, aromatic hydrocarbons, ketones, and esters. Aging and general sunlight do not affect these plastics, but continuous sunlight slightly discolors them. The elongation (% in two inches) is to 40% for Type I and to 500% for Types II and III. The flexural strength is 14,000 to 18,000 pounds per square inch for Type I and reportedly better than that of rubber for the other types. The abrasion resistance is said to be better than rubber up to 160° F. for Types II and III and up to 200° F. for Type I. All have good tear resistance and machinability. Their compressibility and cold flow reportedly, is extremely low. The tensile strengths are: Type I, 5,000 to 60,000 pounds per square inch; Type II to 36,000; Type III, to 9,000. These plastics will not support combustion. Type I has a continuous heat resistance up to 200° F., and Types II and III to 160° F.

The raw materials from which the "V" plastics are made are said to be plentiful and readily obtainable.

How to Select, Install, and Maintain Electric Motors—I

O. F. Vea[1]

PRESENT-DAY conditions make it necessary that all electric motors be babied. Maintenance programs must be intensified to prevent breakdowns because 24-hour-a-day, seven-day-a-week war production schedules cannot be interrupted—output lost today cannot be made up tomorrow. Even the failure of an inconspicuous piece of equipment can cause a considerable disruption in production. On the other hand industrials engaged in non-war activities must "keep 'em turning" as long as possible because of the difficulty in obtaining new motors without the necessary priority rating.

This article will discuss a general maintenance program. Wherever available, the specific instruction sheet accompanying each motor should be followed.

Selection and Installation

A real maintenance program begins with selection. Motors must be chosen that are properly rated and protected for their work. The selection involves a study of requirements, such as continuous or intermittent duty, starting, torque, speed regulation, and the like. These all have a bearing on just what type of motor to choose.

Tables 1 and 2 show characteristics and applications of standard A.C. and D.C. motors, respectively.

In addition the environment in which the motor is to operate should be considered, as this determines whether an open motor or some form of enclosed motor should be used, and how the motor should be located with respect to the driven load.

The next point to be considered is installation. The most important items from the standpoint of long, trouble-free life for a motor follow. The motor should be located in such a way that it is accessible for inspection and repairs. Of course it is always advisable to install the motor in a place free from adverse conditions unless it is built in a

[1] Motor division, General Electric Co., Schenectady, N. Y.

TABLE 1. CHARACTERISTICS AND APPLICATIONS OF POLYPHASE A.C. MOTORS

Polyphase Type	*Ratings H.P.*	*Speed Regulation*	*Speed Control*	*Starting Torque*	*Pull-out Torque*	*Applications*
General - purpose squirrel cage	0.5 to 200 h.p.	Drops about 3% for large to 5% for small sizes	None, except multi-speed types designed for two to four fixed speeds	200% of full-load for two-pole to 105% for 16-pole designs	200% of full-load	Constant-speed service where starting torque is not excessive. Fans, blowers, rotary compressors, centrifugal pumps, wood-working machines, machine tools, line shafts
Full-voltage starting, high starting torque, low starting current, squirrel cage	3 to 150 h.p.	Drops about 3% for large to 6% for small sizes	None, except multi-speed types, designed for two to four fixed speeds	250% of full-load for high-speed to 200% for low-speed designs	200% of full-load	Constant-speed service where fairly high starting torque is required at infrequent intervals with starting current of about 400% full load. Reciprocating pumps and compressors, conveyers, crushers, pulverizers, agitators, etc.
Full-voltage starting, high-starting torque, high-slip, squirrel cage	0.5 to 150 h.p.	Drops about 7% to 12% from no load to full load	None, except multi-speed types, designed for two to four fixed speeds	300 to 315% of full load, depending upon speed and rotor resistance	300%. This motor will usually not stall until loaded to its maximum torque, which occurs at standstill	Constant-speed service and high starting torque if starting not too frequent, and for taking high-peak loads with or without flywheels. Punch presses, die stamping, shears, bulldozers, bailers, hoists, cranes, elevators, etc.
Wound-rotor, external - resistance starting	0.5 to several thousand	With rotor rings short - circuited, drops about 3% for large to 5% for small sizes	Speed can be reduced to 50% of normal by rotor resistance. Speed varies inversely with the load	Up to 300% depending upon external resistance in rotor circuit and how distributed	200% when rotor slip rings are short circuited	Where high starting torque with low-starting current or where limited speed control is required. Fans, centrifugal and plunger pumps, compressors, conveyers, hoists, cranes, ball mills, gate hoists, etc.
Synchronous	25 to several thousand	Constant	None, except special motors designed for two fixed speeds	40% for slow-speed to 160% for medium-speed, 80% power factor designs. Special high-torque designs	Unity-power factor motors 170%; 80% = power factor motors 225%. Special designs up to 300%	For constant-speed service, direct connection to slow-speed machines and where power-factor correction is required.

TABLE 2. CHARACTERISTICS* AND APPLICATIONS OF D.C. MOTORS, 1 TO 300 H.P.

Type	*Starting Duty*	*Maximum Momentary Running Torque*	*Speed Regulation*	*Speed Control†*	*Applications*
Shunt-wound, constant-speed	Medium starting torque. Varies with voltage supplied to armature and is limited by starting resistor to 125 to 200% full-load torque	125 to 200%. Limited by commutation	8% to 12%	Basic speed to 200% basic speed by field control	Drives where starting requirements are not severe. Use constant-speed or adjustable-speed, depending on speed required. Centrifugal pumps, fans, blowers, conveyers, elevators, wood- and metal-working machines
Shunt-wound, adjustable-speed			10% to 20% increases with weak fields	Basic speed to 600% basic speed (lower for some ratings) by field control	
Compound-wound, constant-speed	Heavy starting torque. Limited by starting resistor to 130 to 260% of full-load torque	130 to 260%. Limited by commutation	Standard compounding 25%. Depends on amount of series winding	Basic speed to 125% basic speed by field control	Drives requiring high starting torque and fairly constant speed. Pulsating loads. Shears, bending rolls, plunger pumps, conveyer crushers, etc.
Series-wound, varying-speed	Very heavy starting torque. Limited to 300 to 350% full-load torque	300 to 350%. Limited by commutation	Very high. Infinite no-load speed	From zero to maximum speed, depending on control and load	Drives where very high starting torque is required and speed can be regulated. Cranes, hoists, gates, bridges, car dumpers, etc.

* Table shows average values for standard motors.
† Minimum speed below basic speed by armature control limited by heating.

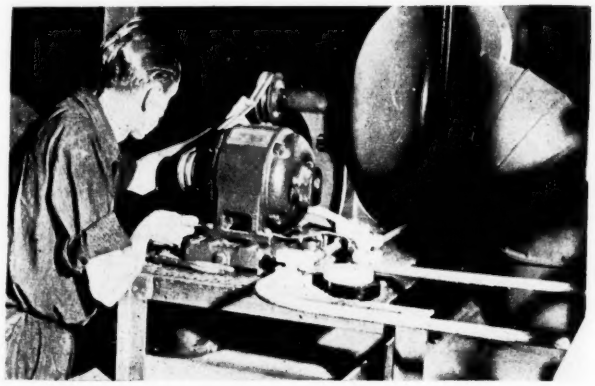


Fig. 1. Proper Installation of Motor

protecting enclosure. It is also important that the motor has ample ventilation so heat losses be carried away.

A standard motor should not be installed where the ambient temperature or normal temperature rise is more than 40° C. The motor should be installed on a solid foundation free from vibration. If it is direct-connected or belted, care should be taken to secure proper alinement, which should permit rotor end-play within reasonable limits.

All these factors must be taken into consideration if inspection and maintenance are not to be most difficult.

Connecting the Motor

All electrical connections to a motor should be made tightly enough so that the vibration of the equipment will not loosen them. Wires joined in a conduit box should be either twisted together and soldered, or bolted together. These joints should be wrapped first with rubber tape and then with friction tape.

Wires issuing from a conduit box, especially rubber-covered extension cords, should be held in some way so that there is no strain on the connections themselves. Usually a knot in the wire inside the conduit box, or the use of conduit-box fittings that grip the wire where it leaves the box, is the most convenient way to obtain this strain relief.

A little extra care when starting a motor for the first time is a good investment. For example, trouble may be avoided by a look at the brushes of a direct-current or single-phase repulsion motor to make sure that they are seating properly on the commutator and with the proper pressure. It is always good practice to turn the motor over by hand before applying power to be sure that it turns freely, and that no foreign materials or objects have fallen into the motor during shipment or handling.

Inspection

When the motor has been properly selected, installed, and connected, the maintenance program really begins. To insure efficient operation and maximum production, inspection and servicing should be systematic.

Frequency of inspection and degree of thoroughness vary and will have to be determined by the maintenance engineer. They will be governed by (1) the importance of the motors in the production scheme (that is, if the motor fails, will the whole works be shut down?); (2) percentage of time the motor operates; (3) nature of service; (4) environment.

An inspection schedule must, therefore, be elastic and adapted to the needs of each plant. The following schedule, covering both A.C. and D.C. motors, is based on average conditions in so far as duty and dirt are concerned:

Every Week

1. Examine commutator and brushes.
2. Check oil level in bearings.
3. See that oil rings turn with shaft.
4. See that shaft is free of oil and grease from bearings.
5. Examine starter, switch, fuses, and other controls.
6. Start motor and see that it is brought up to speed in normal time.

Every Six Months

1. Clean motor thoroughly, blowing out dirt from windings, and wipe commutator and brushes.
2. Inspect commutator clamping ring.
3. Check brushes and renew any more than half worn.
4. Examine brush holders, and clean them if dirty. Make sure that brushes ride free in the holders.
5. Check brush pressure.
6. Check brush position.
7. Drain, wash out, and renew oil in sleeve bearings.
8. Check grease in ball or roller bearings.
9. Check operating speed or speeds.
10. See that end play of shaft is normal.
11. Inspect and tighten connections on motor and control.
12. Check current input and compare with normal.
13. Run motor and examine drive critically for smooth running, absence of vibration, worn gears, chains, or belts.
14. Check motor foot bolts, end-shield bolts, pulley, coupling, gear and journal setscrews, and keys.
15. See that all motor covers, belt and gear guards are in good order, in place, and securely fastened.

Once a Year

1. Clean out and renew grease in ball or roller bearing housings.
2. Test insulation by megger.
3. Check air gap.
4. Clean out magnetic dirt that may be hanging on poles.
5. Check clearance between shaft and journal boxes of sleeve-bearing motors, to prevent operation with worn bearings.
6. Clean out undercut slots in commutator.
7. Examine connections of commutator and armature coils.
8. Inspect armature bands.

Records

The competent maintenance man will have a record card for every motor in the plant. All repair work, with its cost, and every inspection can be entered on the record. In this way excessive amounts of attention or expense will show up, and the causes can be determined and corrected. Inspection records will also serve as a guide to tell when motors should be replaced because of the high cost to keep them in operating condition. Misapplications, poor drive engineering, and the like will also be disclosed.

Cleaning Motors

A systematic and periodic cleaning of motors is neces-

Fig. 2. Making Tight Connections to Eliminate Loosenings from Vibration


H.P. | Rpm. Speed | Make | Connection Diagram | Application | Shop or Mill No. | Card No.

Type | Frame | Poles | F.L. Speed | Volts | Form | Temp. Rating | F.L. Amp. | Phase | Cycles

Serial No. | Publication No. | CONTROL EQUIPMENT

Model No. | Type | Make | Pub. No

BRUSHES: No. Per Motor, Cat. No., Size, Material, Grade

COILS (Cat. or Spec. No.): Stator or Field — Main, Comm, Comp.; Rotor or Armature — Coils, Bars, No. per Slot

LININGS: Front End, Cat. No. | Pulley End, Cat. No.

Connection Diagram

PULLEY: Diam., Face, Belt Width, Bore, Keyway

Mfr's Order No. | Our Order No. | Date of Order | Cost | Motor | Control | User: | Location:

SERVICE RECORD

Date	Building	Floor	Driving	Driver	Tested Hp.

REPAIRS

Date	Condition	Due to	Repaired by	Cost

GENERAL ELECTRIC SERVICE SHOPS are located in the following cities

Atlanta, Buffalo, Charleston, W. Va., Chicago, Cincinnati, Cleveland, Dallas, Detroit, Erie, Fort Wayne, Houston, Kansas City, Mo., Los Angeles, Milwaukee, Minneapolis, New York, Philadelphia, Pittsburgh, Pittsfield, St. Louis, Salt Lake City, San Francisco, Schenectady, Seattle, West Lynn (River Works), West Lynn (West Lynn Works)

Fig. 3. Both Sides of a Maintenance Record Card for Motors

sary to insure best operation. While some machines are installed where dust, dirt, and moisture are not present, most motors are located where some sort of dirt accumulates in the windings.

Steel-mill dusts are usually highly conductive, if not abrasive, and lessen creepage distances. Other dusts are highly abrasive and actually cut the insulation in being carried through by the ventilating air. Fine cast-iron dust quickly penetrates most insulating materials.

Hence the desirability of cleaning the motors periodically. If conditions are severe, open motors might require a certain amount of cleaning each day. For less severe conditions weekly inspection and partial cleaning are desirable.

For the weekly cleaning, the motor should be blown out with dry, compressed air (about 25 to 30 pounds per square inch pressure). Where conducting and abrasive dusts are present, even lower pressure may be necessary, and suction is to be preferred, as damage can easily be caused by blowing the dust and metal chips into the insulation. On larger D.C. machines, the air ducts should be blown out so that the ventilating air can pass through as intended.

In cleaning a motor the heavy dirt and grease should first be removed with a heavy, stiff brush, wooden or fiber scrapers, and cloths. Rifle-cleaning brushes can be used in the air ducts. Dry dust and dirt may be blown off, using dry compressed air at moderate pressure. Care must be taken to direct the air so that dust will not be pocketed in the various corners.

Grease, oil, and sticky dirt are easily removed by applying cleaning liquids like carbon tetrachloride, gasoline, or naphtha. There are several good methods of applying the cleansing liquid. Probably the best is to spray it on. Care must be taken not to soak the insulation by dipping coils or small motors into the liquid.

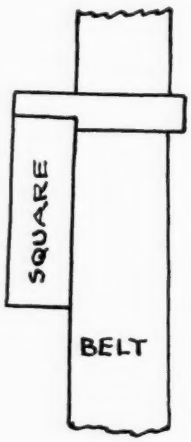
While the insulation will dry quickly at ordinary room temperature after cleaning, it is highly desirable to heat it to drive off all moisture before applying varnish. If the motor can be spared from service long enough, the insulation should be dried out by heating to from 90° to 100° C.

While the motor is warm, a high-grade insulating varnish should be applied. For severe acid, alkali, or moisture conditions where oil or dusts are present, special varnishes can be supplied.

The varnish may be sprayed or brushed on. For small stators or rotors, it is best to dip the windings into the varnish, cleaning off the adjacent metal parts afterwards by using a solvent of the varnish. After applying the varnish, the best results are obtained by baking for a length of time recommended by the varnish manufacturer, which often is from three to seven hours at about 100° C.

If the machine must be put back in service quickly, or if facilities are not available for baking, fairly good results will be obtained by applying one of the quick-drying black or clear varnishes which dry in a few hours at ordinary room temperatures.

(To be continued)



Be a Copyist When Making Belt Joints

Before making a joint in any belt it is a good plan first to examine the belt carefully and study the joints already in the belt as made by its manufacturer. Then make your joint as nearly like the manufacturer's joint as possible. By so doing you can be pretty sure that you will make as good a joint as can be made. This rule applies to all kinds of belts.

Also, when cutting a belt, the *first* rule, and a very important one, is to cut the belt *square*—at absolute right angles with the outer edges. Always use a square, as indicated in the accompanying sketch. Do the cutting while the square is in position, and be certain that the operation is performed correctly. Do not attempt to do this important job with the eye alone. Many valuable belts are ruined annually because this seemingly small point is ignored. Its importance can hardly be overemphasized.

By way of explanation, every reader knows that it is easy to tear an ordinary sheet of writing paper with one's hands by applying the tearing force to one edge. But when that same force is distributed equally over the entire sheet, human strength is not great enough to pull it apart. The same applies to belts. Unless cut perfectly square, it is obvious that one edge of the belt will be under greater tension than other parts, and the fasteners are likely to pull out. Fabric belts are liable to split down the middle. The belt will also run from side to side on the pulleys and may run off frequently.

Belt cutters are now on the market which assure cutting the belt perfectly square. In plants where many belts are used, such cutters are a great convenience and an economy factor. The same is true of machines that automatically lace belts together, perfectly square. Machines of that type also are available on the market.

A PAT ON THE BACK DEVELOPS CHARACTER, IF ADMINistered young enough, often enough, and low enough. *Russel County NEWS.*

Compounding Buna S Synthetic Rubber—I[1]

LABORATORY work and observations on compounding Buna S[2] rubber should be of major interest to almost everyone in the rubber industry at this time. A considerable number of compounds designed for possible use in tire treads or other molded items, inner tubes, mechanical goods, and insulated wire have been prepared from Buna S rubber in the laboratory and tested in as many instances as were possible in comparison with similar compounds made from natural rubber.

Factory trial runs in which field telephone wire was made from Buna S compounds in comparison with a natural rubber compound were successful in that good operating conditions were finally found, and the Buna S insulation gave satisfactory and possibly superior results in some instances when judged by standard laboratory tests.

A series of laboratory compounds made from mixtures of Buna S and whole tire reclaim in comparison with a similar series made using equal amounts of natural rubber and whole tire reclaim gave some interesting information on the possible manufacture of articles from the Buna S-reclaim combinations as a means of conserving natural rubber.

Summary of Results Obtained

One essential difference between compounding natural rubber and Buna S is that Buna S without fillers gives very low values for tensile strength and the use of reenforcing pigments is necessary to obtain satisfactory physical properties in the vulcanized compound. Channel-type carbon black gives the best results, and mixtures of channel black and soft blacks will produce stocks of varying degrees of hardness without too much loss of tensile strength. Further reduction in hardness may be obtained by the use of Kalvan, an ultra-fine particle size coated calcium carbonate, but not without further loss of tensile strength. Kalvan and Gilders whiting were compared in two types of wire compounds and the former was found to have a better curing rate and better physical properties in both cases.

Softeners similar to those for natural rubber are used and sulphur and certain accelerators, but somewhat different amounts and ratios than with natural rubber are indicated. Sulphurless Buna S compounds were shown to have superior properties to sulphur compounds in some respects. Various accelerations and sulphur ratios in 35% wire insulating stock using Tysonite (organic thermoplastic material) as a processing agent and Kalvan as a main filler showed that all accelerations were slower than with crude rubber, but a reasonably satisfactory curing combination was found. Antioxidants are recommended to obtain the best aging properties even though some antioxidant is present in the unprocessed Buna S.

The incorporation of compounding materials, particularly carbon blacks, into Buna S to a satisfactory degree of dispersion is more difficult and is, therefore, a more critical and more important part of compounding than with natural rubber.

The physical properties of the various stocks tested show, to varying degrees, lower tensile strength, lower elongation, and lower tear resistance, particularly at high temperatures, and in general have lower resilience and hardness under comparable conditions than do natural rubber compounds. Aging, as determined by the oxygen bomb, was better for the Buna S stocks, particularly when samples of these were tested at 100° C. after various periods of such aging. Electrical properties, such as dielectric constant and power factor, that could be considered satisfactory in comparison with a smoked sheet compound were obtained on field telephone wire made during the production trials using Buna S compounds.

Results in most cases are from laboratory mixing and testing, and equal results may not always be obtained with factory mixing. Where factory mixings with Buna S give poorer results than laboratory mixings, it is very probable that more care and exactness in factory work will be required in order to avoid waste of important labor and material.

Processing

Although Buna S is relatively soft it does not smooth readily on the mill. Hot milling may cause crumbling, and prolonged milling reduces tensile strength; therefore the use of a cool mill is necessary, and over-milling should be avoided. The order of mixing on the laboratory mill may be the same as with crude rubber, but carbon black should be added in small increments and completely incorporated before each addition. Dispersion of other fillers is not so difficult; but since the properties of the finished product are dependent on the complete dispersion of all fillers to a greater extent than with natural rubber, mixing schedules should be closely observed, and the best methods worked out by experimentation for particular compounds. Refining the mixed stock after a rest period of several hours improves the physical properties. The tests of curing rate at 220° F. indicate that Buna S stocks should process satisfactorily without scorching.

Reclaimed rubber used with Buna S helps processing, but usually lowers physical properties more than a comparable loading of reclaim on crude rubber. However the use of mixtures of Buna S and reclaimed rubber in place of mixtures of natural rubber and reclaimed rubber for many articles would seem to be an important means of conserving natural rubber as our production of Buna S provides sufficient amounts for such substitution.

General Compounding

Buna S requires the use of softeners for satisfactory processing properties although their use tends to reduce modulus and tensile with a corresponding increase in elongation. No completely satisfactory tack-producing softener has been found as yet. Stearic or other fat acids may be used and have some softening action, but have not been found essential to vulcanization. Many fillers were tested, but carbon blacks were found to give the best results where tensile strength, modulus, and elongation are of major importance. Mixtures of channel and soft blacks as well as other fillers known to have some reenforcing action on Buna S produced variation in hardness, but not without considerable loss of strength.

Zinc oxide in amounts of at least two parts on the

[1] This article was prepared from five booklets recently issued by R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y., and from discussions with members of the staff of that company. EDITOR.

[2] Buna S used was a blend of lots received from various sources through Rubber Reserve Co., all of which was produced according to present government standards for this material.

Tire Tread Compounds

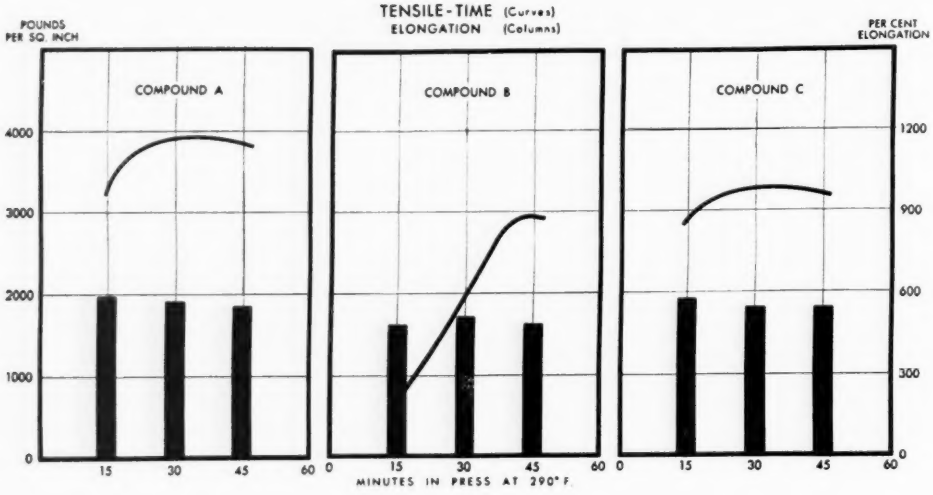


Fig. 1

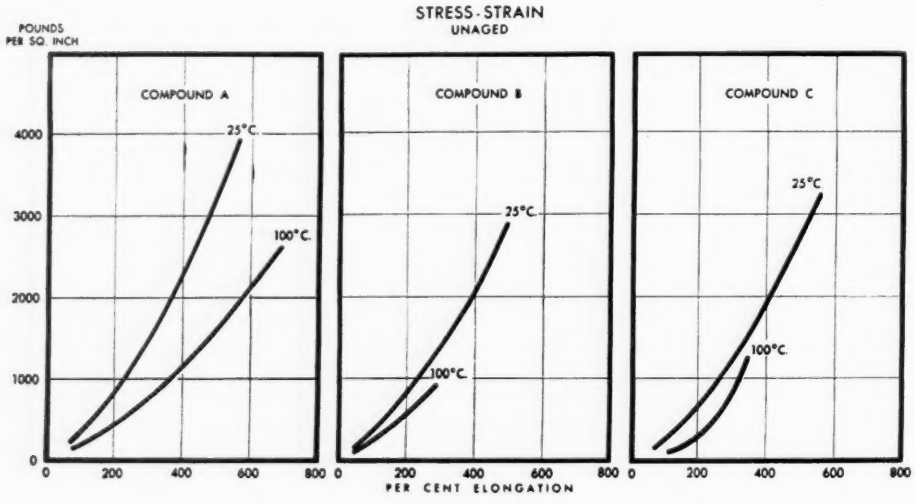


Fig. 2

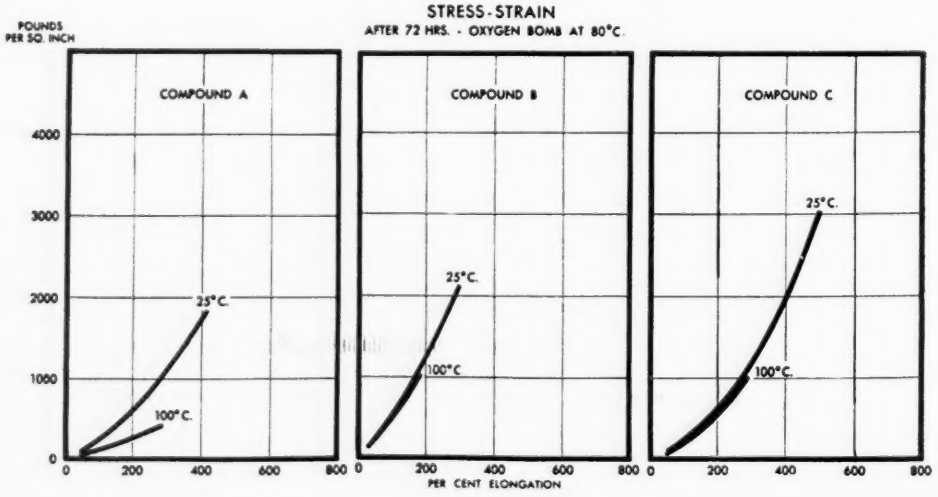


Fig. 3

TIRE TREAD COMPOUNDS

Table 1

	A Rubber—Normal Sulphur	B Buna S—Normal Sulphur	C Buna S—Sulphurless
Smoked Sheet	100	—	—
Buna S	—	100	100
Reogen	2	—	—
Stearic Acid	3	—	—
Pine Tar	1	—	—
AgeRite Resin D	1	2	2
AgeRite Hipar	1	—	—
Zinc Oxide	3	3	3
Carbon Black	50	50	50
Captax	1	—	1
Altax	—	1.5	—
Selenac	—	—	2
Vandex	—	—	0.2
Sulphur	3	2	—
	165	158.5	158.2
PRESS CURES AT 220° F.		Curing Rate at 220° F.	
60 Min.	—	—	Uncured
75 Min.	—	Uncured	Slightly Cured
90 Min.	Uncured	Slightly Cured	Cured
120 Min.	Slightly Cured	Cured	—

Table 2. Tensile Properties

Stress at 300% (*S*)—Tensile (*T*)—% Elongation (*E*)

	A Rubber—Normal Sulphur			B Buna S—Normal Sulphur			C Buna S—Sulphurless		
PRESS CURES AT 290° F.	*S*	*T*	*E*	*S*	*T*	*E*	*S*	*T*	*E*
Before Aging Tested at 25° C.									
15 Min.	1095	3270	595	425	625	470	1150	2950	570
30 Min.	1525	3960	575	890	1940	520	1365	3280	545
45 Min.	1615	3880	560	1360	2900	520	1375	3210	540
Tested at 100° C.									
15 Min.	450	1970	745	—	175	285	845	1085	370
30 Min.	710	2670	685	545	795	335	860	1290	360
45 Min.	605	2810	630	—	935	285	1025	1095	315
After Three Days in Oxygen Bomb (at 80° C., 300 Lbs. Oxygen) Tested at 25° C.									
15 Min.	1060	1830	485	780	1490	540	1430	2700	500
30 Min.	1490	1890	410	1490	2410	490	1690	3060	480
45 Min.	—	1540	250	—	2180	290	1820	2920	440
Tested at 100° C.									
15 Min.	470	590	420	425	680	370	995	1115	340
30 Min.	—	470	280	960	1020	320	1145	1155	300
45 Min.	—	270	175	—	1080	190	—	1110	290

Table 3. Stress-Strain at 25° C. and 100° C.

PRESS CURES AT 290° F.	A Rubber—Normal Sulphur 30 Min.		B Buna S—Normal Sulphur 45 Min.		C Buna S—Sulphurless 30 Min.	
Stress at 100% Elong.	340	170	340	210	285	160
Stress at 200% Elong.	770	450	810	520	660	300
Stress at 300% Elong.	1525	700	1360	—	1365	860
Stress at 400% Elong.	2260	1100	2100	—	1940	—
Stress at 500% Elong.	3120	1600	—	—	2670	—
Stress at 600% Elong.	—	2050	—	—	—	—
Stress at Break Elong.	3960	2670	2900	935	3280	1290

Table 4. Stress-Strain at Low Elongations (10-inch Loops)

PRESS CURES AT 290° F.	A Rubber—Normal Sulphur 30 Min.		B Buna S—Normal Sulphur 45 Min.		C Buna S—Sulphurless 30 Min.	
Extension	First	Fourth	First	Fourth	First	Fourth
Stress at 2.5% Elong.	48	0	32	0	32	0
Stress at 5 Elong.	56	16	48	0	48	0
Stress at 10 Elong.	72	40	64	24	64	28
Stress at 20 Elong.	104	64	88	50	88	56
Stress at 40 Elong.	152	96	128	84	128	96
Stress at 60 Elong.	200	128	160	112	152	120
Stress at 75 Elong.	**232**	**154**	**184**	**134**	**172**	**144**
Stress at 100 Elong.	288	232	232	192	216	188

Table 5. Impact Resilience

PRESS CURES AT 290° F.	A Rubber—Normal Sulphur 30 Min.	B Buna S—Normal Sulphur 45 Min.	C Buna S—Sulphurless 30 Min.
	% Energy Regained		
Tested at Room Temperature	37	34	35

Table 6. Shore Hardness

PRESS CURES AT 290° F.	A Rubber—Normal Sulphur	B Buna S—Normal Sulphur	C Buna S—Sulphurless
15 Min.	59	51	61
30 Min.	64	60	61
45 Min.	64	61	61

Table 7. Tear Resistance (Crescent Method, Pounds Per Inch Thickness)

PRESS CURES AT 290° F.	A Rubber—Normal Sulphur	B Buna S—Normal Sulphur	C Buna S—Sulphurless
Before Aging Tested at 25° C.			
15 Min.	610	135	370
30 Min.	670	195	370
45 Min.	635	290	285
Tested at 100° C.			
15 Min.	250	50	195
30 Min.	310	110	175
45 Min.	235	170	145
After Three Days in Oxygen Bomb (at 80° C., 300 Lbs. Oxygen) Tested at 25° C.			
15 Min.	470	210	350
30 Min.	380	315	300
45 Min.	305	315	270
Tested at 100° C.			
15 Min.	100	82	190
30 Min.	105	169	185
45 Min.	105	165	160

Buna S seemed necessary for the activation of the accelerators. In wire insulation compounds larger amounts are used in order to provide other special properties that are required for these products.

In a 35% rubber stock for wire insulation, various accelerations and sulphur ratios were found to be slower curing with Buna S than with crude rubber. Proportions of 0.5% Altax, 0.5% Zimate, and 2% sulphur yielded reasonably satisfactory cures.

Compounds for field telephone wire insulation gave best results using Selenac, a small amount of litharge, and very low sulphur for curing.

Comparison of Kalvan and Gilders whiting was made in two types of wire insulation stocks of different acceleration, and Kalvan was found to be more satisfactory in curing rate and physical properties in both cases. Microscopic examination revealed that the Buna S had wet the Kalvan while it had not the whiting filler.

Ozone-resistant insulation compounds prepared from smoked sheet and Buna S gave comparable physical tests and were reported as having excellent ozone resistance. No wire was made from these compounds, but the substitution of Buna S for natural rubber should be easily possible in this type of compound.

Factory trials of Buna S compounds for field telephone wire insulation resulted in the use of one compound that under proper tubing conditions produced wire which, although the physical properties of the insulation were inferior in comparison with a similar insulation using a smoked sheet compound, had good electrical properties and would probably be satisfactory for this type of work.

Three equivalent combinations of whole-tire reclaim with Buna S, and with smoked sheets were prepared and tested. A mix containing 50 parts of Buna S and 100 parts of whole-tire reclaim gave tensile properties almost equal to another mix containing 75 parts of Buna S and 50 parts of reclaim. The use of the first mix would therefore represent a considerable saving in Buna S with very little loss of tensile properties. Ample tack was produced in these mixes by the use of 3% to 5% of Reogen (a mixture of mineral oil, sulphonated petroleum oil, and normal butyl alcohol) on the reclaim. Although Reogen is not a tack producer for Buna S, it does act on the reclaim and provides tack for the combination. With this 50 Buna S-100 reclaim mix, the comparative effect of four fillers, channel black, soft gas blacks (P-33 and Thermax), and finely divided calcium carbonate (Kalvan) was determined. Although channel black gave the best overall results, greater loadings of the soft blacks at an equal and in one case a lower pound volume cost gave some physical properties such as resilience and adhesion to steel that were better.

Vulcanization

Buna S was found to require lower sulphur and higher acceleration ratios than natural rubber. The thiazole-type accelerators such as Captax and Altax seem to be the most satisfactory and may be used with safety in amounts as high as two parts on the Buna S in processing. Ultra-accelerators of the thiuram and dithiocarbamate type may be used with Buna S without as much danger from scorching as with crude rubber. The final curing rate with these accelerators in Buna S is not so fast as in natural rubber, but is still somewhat faster than the thiazoles in Buna S.

Normal sulphur requirements were about 2%, and Selenac (selenium diethyl-dithiocarbamate) and Vandex (finely ground selenium) used in combination without any additional sulphur gave physical properties more nearly equal to those of natural rubber compounds. Removing Vandex from the formula results in lower modulus, lower tensile, and higher elongation. The sulphurless Selenac compounds are sensitive to the effect of sulphur, since the addition of as little as 0.1% raises the modulus and lowers the elongation. Sulphur acts more like an accelerator under these conditions.

Physical Test Data

Most of the compounds were mixed and cured according to ASTM procedures.[3] Curing of the wire insulation compounds (to be reported in a later installment) was done in open steam at pressures of about 200 lbs./in.[2] in a laboratory vulcanizer designed to give conditions equivalent to continuous cure of wire in factory production.[4] Testing was also according to ASTM methods except in cases where special modifications are practiced by the Vanderbilt laboratory, which are indicated.[5] These changes[5] are described together with supporting data.

Tire Tread Compounds

The results of laboratory work and observations on the compounding of Buna S in carbon black formula suitable for tire treads and other molded items were reported.[6] The formula for the compounds used which included rubber-normal sulphur, (compound A), Buna S and sulphur, (compound B), and Buna S using Selenac and Vandex and no sulphur, (compound C), are shown in Table 1 together with scorch tests at 220° F. Rate of cure seems sufficiently low for safe processing.

Complete tensile and elongation tests, which have been used to show stress-strain properties, indicate the Buna S-Altax-sulphur compound to have a sharper curing rate curve than the sulphurless Buna S compound (see Figures 1 and 2 and Tables 2 and 3). The tests on the unaged samples show the Buna S compounds to have about three-fourths the value of the natural rubber compound in tensile strength and elongation over most of the modulus when tested at 25° C. The tests on the unaged compounds made at 100° C. on a Scott testing machine equipped with temperature control tanks,[7] show very poor results for the Buna S compounds; but after aging for 72 hours in the oxygen bomb at 80° C., the Buna S compounds are superior to the natural rubber compound, particularly the sulphurless Buna S compound tested at 25° C. or 100° C. This might be interpreted to mean that although Buna S compounds may lose strength more rapidly with increasing temperatures, the end result will not be so low as that of natural rubber, and, therefore, goods made from Buna S in places where temperatures as high as 100° C. are experienced might be as durable if not so efficient in service as those made from natural rubber. (See Figure 3.)

Results of stress-strain tests at low elongations[8] show that Buna S compounds have about 80% of the "kick" of natural rubber compounds on the initial pull. After "massaging" four times they have about 90% of the strength of the natural rubber compounds, with the sulphurless Buna S compound somewhat higher. These facts are illustrated in Figures 4 and 5 and Table 4. Products made from Buna S used at low elongations such as tire treads and molded items in a few instances reported elsewhere have given satisfactory service.

---

[3] ASTM Standards on Rubber Products, Dec., 1941.
[4] India Rubber World, Sept. 1, 1937, p. 41.
[5] Vanderbilt Laboratory uses 80° instead of 70° C. See "The Vanderbilt Rubber Handbook", 1942 Ed., pp. 333-35.
[6] "Compounding of Buna S", Laboratory Report, R. T. Vanderbilt Co., May 15, 1942.
[7] *Vanderbilt News*, Sept.-Oct., 1933, pp. 4-5.
[8] Vanderbilt test method using molded 10-inch loops of ¼-inch diameter.

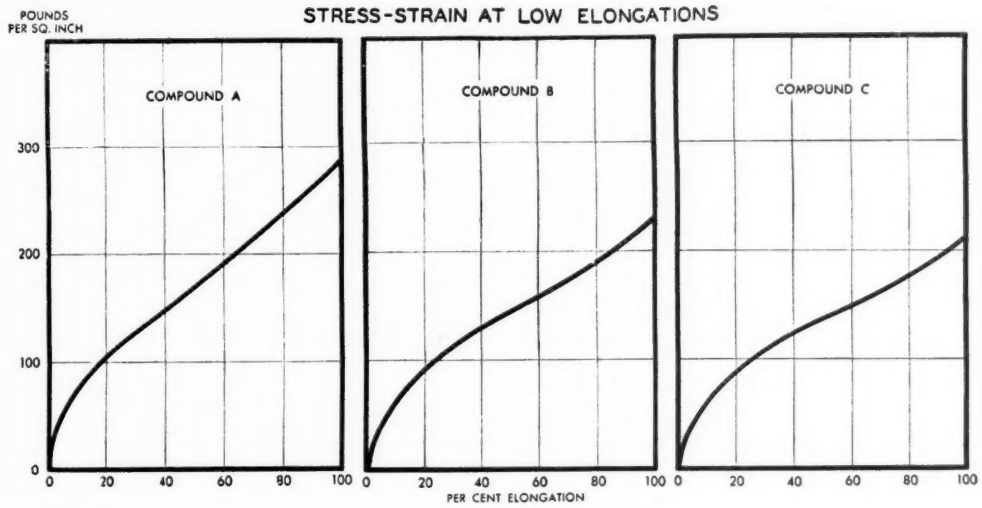


Fig. 4. (Tire Tread Compounds)

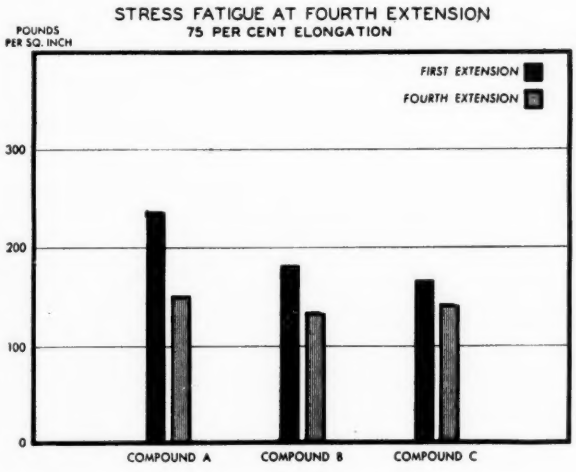


Fig. 5. (Tire Tread Compounds)

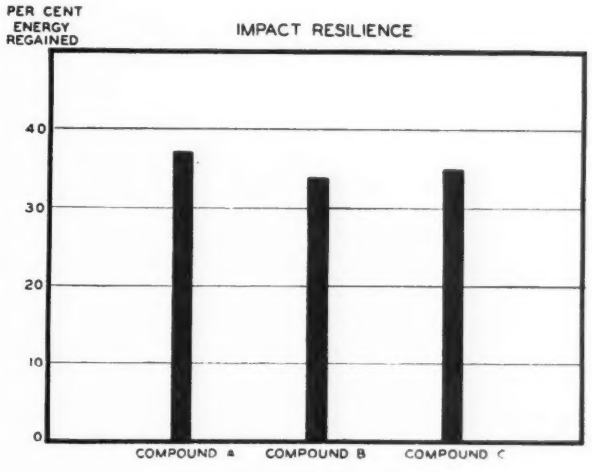


Fig. 6. (Tire Tread Compounds)

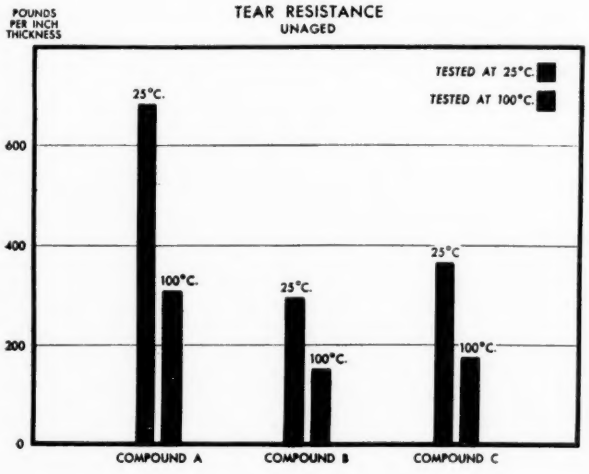


Fig. 7. (Tire Tread Compounds)

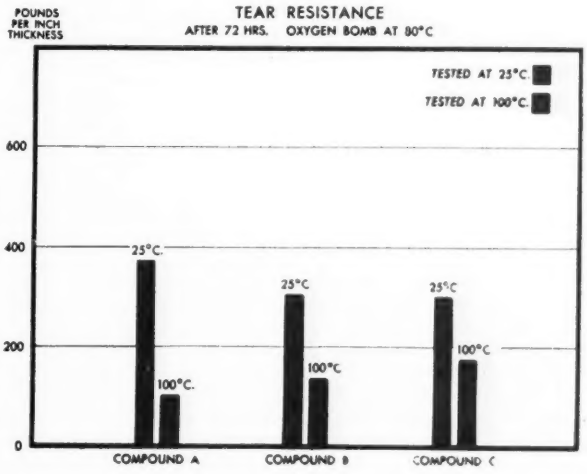


Fig. 8. (Tire Tread Compounds)

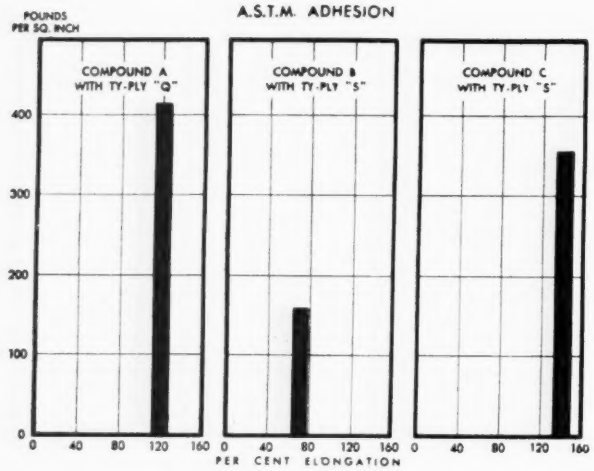


Fig. 9. (Tire Tread Compounds)

Resilience of the Buna S compounds, as measured by the Lupke impact resiliometer,[9] is only slightly lower than of the natural rubber compound. (See Table 5 and Figure 6.)

The Shore hardness of the Buna S compounds is slightly lower, as indicated in Table 6.

Tear resistance, as measured by the crescent method,[10] (force required to produce rupture in a specimen one inch thick) was noticeably lower for the Buna S compounds, although the sulphurless Buna S compound was better than the Buna S-sulphur compound when the unaged samples were tested at 25° C. and 100° C. After oxygen aging, the tests on the Buna S compounds made at 100° C. had a higher tear resistance than compounds made from natural rubber (Table 7, Figures 7 and 8).

Adhesion to steel, as determined by A.S.T.M. method D 429-39, was 90% of that obtained with natural rubber when the sulphurless Buna S compound and Vanderbilt's Ty-Ply S were used. (See Figure 9 and Table 8.)

[9] See pp. 296-97 of the Vanderbilt handbook, 1942 Ed.
[10] *Ibid.*, pp. 281-84.

(*Continued on page 499*)

TABLE 8. A.S.T.M. ADHESION TO STEEL
Pounds per Square Inch (*A*)—% Elongation (*E*)

Adhesive	Ty-Ply "Q"		Ty-Ply "S"		Ty-Fly "S"	
PRESS CURES AT 290° F.	*A*	*E*	*A*	*E*	*A*	*E*
40 Min.	410	120	—	—	360	130
55 Min.	—	—	160	70	—	—

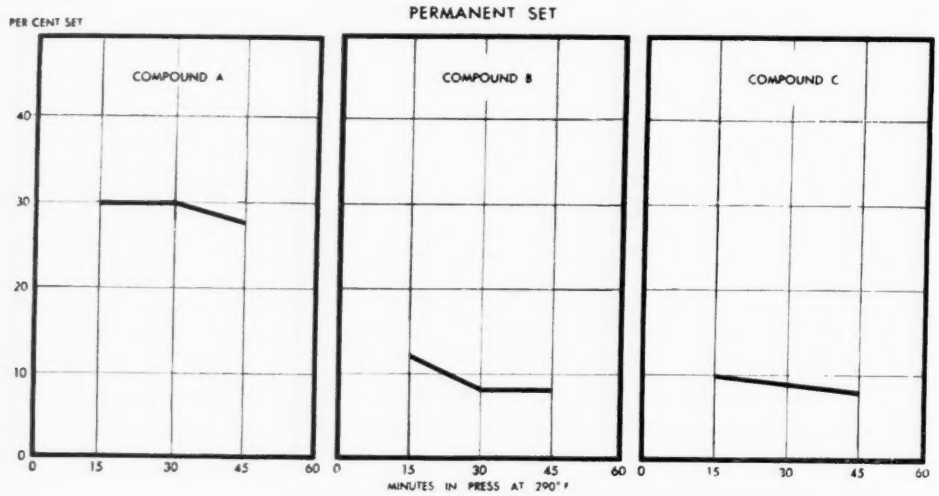


Fig. 10
(Tire Tread Compounds)

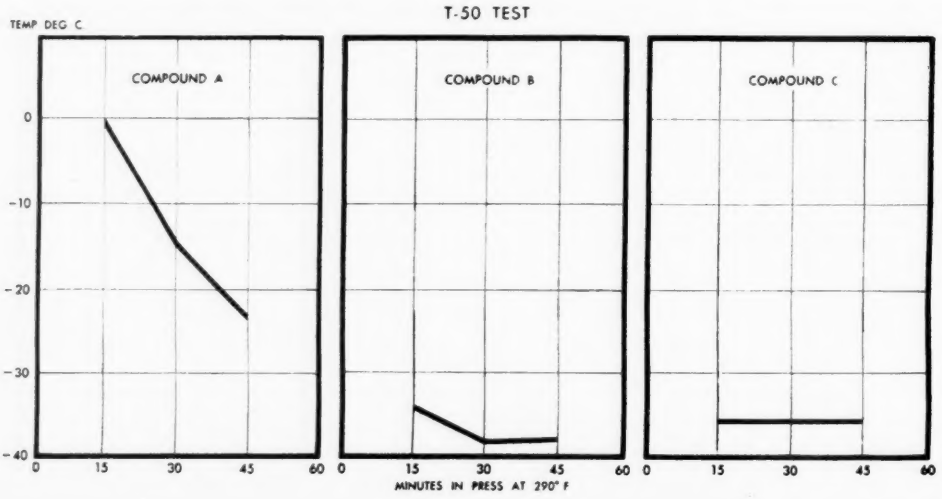


Fig. 11
(Tire Tread Compounds)

German Patents Relating to Vinyl Polymers—IX

M. Hoseh

THE polymerization of acrylic acid, its homologs and salts is smoothly conducted, according to (98).[1] As a reaction medium is used a solvent in which the monomer is soluble, but not the polymer. It is evident that this procedure gives a means for controlling the characteristics of the polymer. Paraffinic hydrocarbons are particularly suitable solvents for this purpose. The specific gravity of the solvent is important in determining the form in which the polymer precipitates. By using paraffin oil for a solvent the specific gravity can be adjusted by mixing it with benzine of a suitable density, with solid paraffin, ozokerite, ceresin, etc. However, different starting materials behave differently in the same solvent. Thus, whereas methyl acrylate forms a coherent porous polymer, methyl methacrylate precipitates as a voluminous powder. The concentration of the monomer is at an optimum at 10-40% ; however departure from these limits is allowable. The concentration is yet another determinant of the nature of the product. The usual catalysts are employed, but their relative amounts affect the product, as do the working temperature and duration of reaction.

To make durable and resistant polishing and grinding implements, (99) advises the use of vinyl compound polymers and hardenable resins as binders for the abrasive. Suitable vinyl compounds are polymerized styrol, its homologs, and derivatives; vinyl esters, ethers, and halides; acrylic acid, acrylic esters, and acrylic nitriles. These are mixed with resins capable of being hardened, e. g., phenol-aldehyde, urea-aldehyde, polybasic carboxylic acids, or polyhydric alcohol condensation products. Polishing and grinding implements thus produced are more resistant to heat, water, and aging.

Heat and light resistant polyvinyl chlorides are produced according to (100) if the polymerization is done in the presence of a fraction of 1% to a few per cent. of an unsaturated carboxylic acid or its amide. The polymers are washed in an alkaline solution, then washed free of the latter with clean water. This improvement in the product enables its wide use as a thermoplastic.

Patent (101) is an improvement of the procedure described in (57)[2] *(polymers of acrylic acid derivatives or their homologs).* The modified procedure consists in adding the monomers to be polymerized to a vigorously stirred aqueous, warm solution of the emulsifier. The monomers or their mixture are added as a fine spray, fine stream, or dropwise. Polymerization promoters, e. g., H_2O_2, benzoyl peroxide, etc., if used, maye be added to the solution of the emulsifier, to the monomeric mixture, or to both. The rate of adding the monomers is determined by their nature, the temperature of the aqueous solution, the nature of the emulsifier, and the intensity of light.

The polymerization of N-vinylcarbazole and its homologs is the subject of (102). The ease of polymerization is greatly affected by the purity of the monomer. The purer it is, the easier it is to control the properties of the polymer, and the greater is the rate of the polymerization reaction. The polymerization can be induced using only the monomer and working at temperatures above their m.p. (65° C.). The polymerization can also be conducted in emulsions or solutions of the monomers. Further, the N-vinylcarbazole can be polymerized along with other substances capable of polymerization. Accelerators or retarders may be resorted to according to the need. Effective accelerators are BF_3, $SnCl_4$, $ZnCl_2$, $AlCl_3$, SO_2, CO_2, $COCl_2$ (phosgene), SO_2Cl_2, $SOCl_2$, acetyl chloride, and benzoyl chloride; also halogens and hydrohalides promote the reaction. Inorganic and organic peroxides, O_3, air, S, S compounds, activated carbon, activated clay, etc., catalyze polymerization. Among the retarders are alkali metals, their oxides, hydroxides, and carbonates, $Ca(OH)_2$, NH_4OH, as well as organic bases. Mono- and polyhydric aliphatic alcohols are strong retarders; ethers are not quite so strong retarders; heavy metals and their salts, too, are retarders. Depending on the purity of the parent monomer, conditions of reaction, admixtures of other polymerizable compounds, accelerators, retarders, etc., the polymer is plastic and soluble in more or less all organic solvents, or is hard, glassy, insoluble, and heat resistant. Generally the purer the monomer, the more heat resistant is the polymer. The plastified polyvinylcarbazole is suitable for use as bonding material for abrasives and braking materials, and is also used in preparing lacquers, putty, films, thread, coating materials, etc.

The hitherto insoluble high-molecular polyvinyl chlorides are soluble in new solvents described in (103): The cyclic formaldehyde acetals of dihydric alcohols. Such acetals are prepared from ethyleneglycol and formaldehyde, 1, 2-propyleneglycol and formaldehyde, 1, 3-butyleneglycol and formaldehyde. They can be used by themselves or mixed. They can be mixed also with compounds which by themselves are only swelling agents, e. g., methylene chloride. The use of these solvents enables the manufacture of high-molecular polyvinyl chlorides into elastic, transparent foils, bands, sheets, tubes, rods, thread, etc.

A new procedure for the polymerization of vinyl esters is described in (104). The polymerization is done in a medium of a neutral electrolyte. For this purpose are primarily to be considered such salts as NaCl, K_2SO_4, etc., i. e., salts of alkali metals. Heavy-metal salts are preferably avoided for they may interfere with the reaction. The use of solutions of neutral electrolytes as polymerization medium enables a better control of the progress of the reaction, inhibits saponification of the monomeric reactants, and checks the formation of by-products. The new method is amenable to the use of catalysts, regulators, emulsifiers, and to regulating of temperature. These in turn enable to regulate the viscosity, solubility, and other properties of the reaction product.

Polyvinyl compounds, quite rigid at ordinary temperatures, are converted to an absorbent cotton-like material by the process of (105). Thus a solution of polystyrol, polyvinylcarbazole, polyacrylic acid ester, polymethacrylic acid ester, or a mixture of these is sprayed into a warm current of air, N, CO_2, or similar gas. The spraying is so performed that the solvent evaporates before the

[1] For details on patents see end of article.
[2] See INDIA RUBBER WORLD, Feb. 1, 1942, p. 472.

solids settle out. Good results are obtained by spraying the solution with the aid of a rapidly rotating disk. Ordinary temperatures are preferred; avoid temperatures which may cause the solids to stick. The rigidity of the thus-produced fibers as well as their relative length depends largely on the parent material. Generally polyvinyl carbazol and polystyrol are somewhat more rigid and harder than fibers similarly prepared from polyvinyl chloride, polyvinylates, or polyacrylates. The fibrous mass thus prepared is admirably suitable for heat and sound insulation, as filling material, etc. The fibers are resistant to acid, alkali, and decay and are good electric insulators.

To improve the heat-resistance, resistance to bending, and elasticity of articles molded from polyvinylcarbazole or mixed polymers the main component of which is vinylcarbazole, (106) recommends inducing permanent orientation in the molecules of the polymer prior to molding it. Several such possibilities are suggested. The polyvinylcarbazole can be extruded through nozzles or narrow slots at a temperature over 200° C., or the polymer can be rolled between hot rolls, or it can be pressed at the mentioned temperature. Following any of these hot treatments, the material is cooled. During heating, the material is stretched. The polymer thus treated is comminuted in a mill or breaker commonly used for this purpose, and the comminuted material is heat-molded. At no time during the handling should the polyvinylcarbazole be exposed to a temperature above 250° C., for the molecules will reorient themselves at such temperatures. If required, webs, asbestos, metallic powders, wires, etc., can be incorporated into the thermo-pressed mass. The heat molding is usually done at 180-250° C., but the upper limit should not be exceeded. Because of its resistance to oil, water, and heat, the thus-treated polyvinylcarbazole is very desirable for electric insulators.

The production of polymers having a high degree of polymerization and yet soluble is described in (107). This characteristic is attained by polymerizing vinyl esters and using fatty acid peroxides containing more than four C atoms as promoters. High molecular products of vinyl esters having a good solubility are produced with aid of peroxides of butyric, lauric, oleic, etc., acids. Generally a higher number of C atoms induces a higher degree of polymerization. This method is noteworthy inasmuch as benzoic peroxide (not a fatty acid) induces but slight polymerization, and acetylperoxide (less than four C atoms) yields high-molecular polymers, yet in both cases the solubility of the polymers is slight. Whereas the peroxides of the aliphatic dicarboxylic acids are not suitable, their mixtures with monobasic fatty acids can be used to advantage. Thus the mixed peroxides of stearic and succinic, lauric and adipic, etc., are used successfully. The peroxides are obtained in the usual way by causing to react a fatty acid chloride and Na_2O_2, or by the action of NaOH and H_2O_2 on the fatty acid chloride.

Valuable rubber-like products are obtained from polymerizing an excess of a compound of the type $CH_2 : CR \cdot COOR_1$ (acrylic acid derivatives) where R and R_1 denote H or an alkyl, with a butadiene compound, according to (108). Very effective is the use of butadiene or isoprene. Other polymerizable compounds may be incorporated. The product is readily worked on rolls and in kneaders, absorbs fillers well, and can be vulcanized. The vulcanized product resembles rubber closely. Best results are obtained when the compound indicated by the formula amounts to about 40% of the mixture.

Polymers of aliphatic compounds containing the group $CH_2 : C<$ which beside H and C contain also other elements are mixed with aliphatic, liquid, polymers of acetylene that can be polymerized still further and are described in (109). These liquid, oily acetylene polymers can be produced by polymerizing compounds such as divinyl acetylene with the aid of gases containing oxygen or under the influence of heat. The acetylene polymers can be mixed with compounds mentioned above before, during, or after their polymerization. The addition of these oily substances to polymers of acrylic acid or its compounds, such as acrylic esters and acrylonitrile, is particularly beneficial. The mixing of the two takes place in the presence of a solvent. Upon evaporation of the solvent, the dry residue becomes insoluble and is desirable for many uses. The mixing of the two components can be done also by any other methods, e. g., kneading, rolling, etc. Other substances, such as fillers, pigments, other polymerization products, plasticizers, synthetic resins, etc., may be added.

Very thin films (0.05-0.03 mm.) can be produced readily from a mixture described in (110). It consists of a mixture of mixed polymers of vinyl chloride and one or more esters of acrylic acid and a saturated or not aliphatic alcohol with more than three C atoms in its molecule. A few of very desirable compositions are: vinyl chloride and butyl acrylate in a ratio of 80:20; vinyl chloride and octyl acrylate in a ratio of 85:15; or vinyl chloride, butyl acrylate and octodecyl acrylate in the ratio 80:15:5. Also the acrylates of alcohols of the alkylene series with more than three C atoms are suitable. These polymers are rolled on hot rolls to a thickness indicated above. Foils prepared from these mixtures, the composition of which may vary to suit the purpose, are light and heat resistant. These foils can be decorated by printing, coloring, etc. Their uses are multitudinous.

In (111) the use of nitrocellulose as a surface material on which to form foils from chlorinated polyvinyl chloride and polystrol by the precipitation-bath method is revealed. Previously the side of the foil facing the surface on which it was formed was invariably dull regardless of the type of surface used. By the use of nitrocellulose as a surface on which to form the foils this difficulty is eliminated. The nitrocellulose employed for this purpose must contain at least 12.4% N. Another advantage resulting from the use of nitrocellulose is that the moisture content of the foils dried as usual is only 1.5-1.7%, contrasted with a moisture content of approximately 5% after the usual drying for foils formed on any other surface. The diminished moisture content favorably affects other properties. For example, the softening point is raised from 50° to 66° C.

Patent References

(98) No. 662,157. Applied Mar. 24, 1932. Granted June 9, 1938. W. Bauer and H. Lauth to Röhm & Haas, A. G., Darmstadt.
(99) No. 662,636. Appl. Feb. 20, 1932. Gr. June 23, 1938. I. G. Farbenindustrie, A. G., Frankfurt, a. M.
(100) No. 663,200. Appl. Oct. 19, 1935. Gr. July 7, 1938. H. Fikentscher and W. Franke, to I. G. Farbenindustrie.
(101) No. 663,469. Applied June 7, 1930. Granted July 14, 1938. H. Fikentscher and C. Heuck, to I. G. Farbenindustrie.
(102) No. 664,231. Appl. July 25, 1934. Gr. Aug. 4, 1938. W. Reppe, E. Keyssner, and E. Dorrer, to I. G. Farbenindustrie.
(103) No. 664,232. Appl. May 28, 1936. Gr. Aug. 4, 1938. I. G. Farbenindustrie.
(104) No. 664,351. Appl. May 13, 1933. Gr. Aug. 11, 1938. A. Voss, K. Eisfeld, and H. Freudenberger, to I. G. Farbenindustrie.
(105) No. 666,415. Appl. Mar. 29, 1935. Gr. Sept. 29, 1938. E. Dorrer and K. Wulff, to I. G. Farbenindustrie.
(106) No. 666,416. Appl. Oct. 24, 1935. Gr. Sept. 29, 1938. H. Beck and E. Dorrer, to I. G. Farbenindustrie.
(107) No. 666,866. Appl. July 27, 1934. Gr. Oct. 6, 1938. A. Voss and W. Heuer, to I. G. Farbenindustrie.
(108) No. 667,163. Appl. Apr. 26, 1930. Gr. Oct. 13, 1938. E. Konrad and W. Bock, to I. G. Farbenindustrie.
(109) No. 667,863. Appl. June 2, 1933. Gr. Oct. 27, 1938. W. Bauer, to Röhm & Haas.
(110) No. 669,747. Appl. Dec. 16, 1934. Gr. Dec. 8, 1938. Deutsche Celluloid-Fabrik, Eilenburg.
(111) No. 669,748. Appl. Aug. 9, 1936. Gr. Dec. 8, 1938. Deutsche Celluloid-Fabrik.

(To be continued)

Hevea Rubber Culture in Latin America[1]

Problems and Procedures — III . . .

R. D. Rands[2]

THE supply of readily available seed for budding nurseries is already becoming a "bottleneck" in rapid multiplication of clones in several Latin American countries outside the indigenous range of *Hevea*. Fortunately this problem is partially solved by what are commonly spoken of as the "failures" of previous attempts to establish rubber cultivation in these countries.

Seed Gardens for Production of Root Stocks

EXISTING GROVES OF TREES. Many unselected seedling plantings of earlier years made with the expectation of their development into producing plantations still exist and are now composed of mature trees with large annual seed-production capacity. The reports of the Rubber Survey in 1940-41 list a total of 23 groves in widely separated regions from southern Mexico to Peru and ranging in number of trees each from a dozen to more than 20,000.

Secondary jungle and underbrush, crowding many of these abandoned plantings, have been removed, and the seed collected for establishment of nurseries. The remaining groves will also be utilized if possible under cooperative arrangements of the local governments with the owners of the trees. Application of fertilizers and other measures to promote maximum seed production are being undertaken along with studies to find the best methods for maintaining viability of the seed during local and long-distance transport.

Since budwood and budded stumps of the clones recommended for commercial planting have been distributed equitably to all cooperating countries prepared to use the material, a similar apportionment of seed for nurseries also has been achieved under the intergovernmental cooperative program. Thus, any excess above local requirements in a particular country may be exported to other countries less fortunate in their local seed supply. Local needs are readily determined by calculating the rate of multiplication of budwood of those clones to be used in commercial plantings. A multiplication ratio of 20:1 per year, plus 50% additional seed to allow for germination failure and poor growth, is commonly accepted in calculating root-stock requirements. Since the clones in Groups 2 and 3[3] will not be released from quarantine and distributed to blight-free areas before the Fall of 1942, only sufficient seedlings should be established each year as can be budded before they are three years of age. To plant more than this or to increase Group 1 clones, which have already been distributed beyond their proportionate requirement in the planned mixed planting of all three groups, would be wasteful and to the disadvantage of other countries needing the seed unless, of course, the above-described crown budding of susceptible clones or alternative procedures should be followed.

Seed for nursery plantings in blight-infested countries, especially in the Amazon basin, is mainly a problem of organizing collection from wild trees in those areas which give predominately resistant seedlings. Otherwise spraying of the nurseries for control of the blight epidemics is required. The feasibility and low cost of this has been demonstrated by M. H. Langford, of this Department, whose experiments will be published during the current year. However the immediate establishment of seed gardens with resistant clones or seedlings should be undertaken to reduce future seed and nursery costs and assure a home-grown supply.

NEW SEED GARDENS. Seed gardens should be established in all countries in number and size proportional to potential rubber acreage or rate of contemplated expansion. Planting companies will provide their own requirements, but individual growers probably will depend upon seed merchants, community or district gardens. The last-mentioned could well be located on propagation and demonstration farms sponsored by government agencies.

In contrast with the relatively few breeding gardens, described above, the many widely distributed seed gardens should be composed only of blight-resistant clones or seedlings to avoid possible future difficulty and provide an abundant supply of seed for nurseries. Experimental evidence in the Far East indicates higher yields from clones budded on seedlings from high-yielding trees than from low-yielding or unselected trees. Therefore local seed gardens containing a mixture of the presently available and highly resistant selections are recommended. A planting rate of about 250 trees per hectare to allow full crown development and early and maximum seed production is advised.

A cooperative program of experiments to determine the best source and type of root stocks has already been inaugurated in several of the countries. The need of such is emphasized by various reports from the Far East indicating the apparent increased value of a vigorous, high-yielding stock for promoting development and yield of the scion. In a recent extensive review of the subject, Tollenaar (24),[4] in Java, states that increased yields from the use of a productive root stock instead of unselected seedlings in different experiments amounted to 20 to 40%. Therefore good-growing and high-yielding hybrid seed progenies from outstanding clones such as AV-163, BD-10, Tjir. 1, Tjir. 16, and War. 4 are generally recommended for production of stocks. Good vigor alone, however, apparently may increase yields. Schmöle (21),[5] of the A.V.R.O.S. Sumatra Station, reports five-year average yield increases of 14 to 33% for several clones budded on *Hevea brasiliensis* X *H. spruceana* hybrid root stocks in comparison with yields of the same clones budded on unselected *H. brasiliensis* seedling stocks. While these results were from a single small experiment, they indicate the need of further studies on the subject.

In order to investigate the influence of various root stocks on the yield and other characters of the scion, seed from various species of *Hevea* have been collected in Brazil through the initiative of Dr. Felisberto C. Camargo, director, Instituto Agronomico do Norte, Belém, Para. Nurseries have been established at Belém and at cooperative stations in other countries. Some of the seedlings will be used directly as root stocks in comparative experi-

[1] Grateful acknowledgment is made to Karl D. Butler, T. J. Grant, M. H. Langford, and H. G. Sorensen, agents of the United States Department of Agriculture in Latin America, for supplying experimental data on which the clone recommendations in this paper are based.

[2] Senior pathologist, Special Rubber Investigations, Bureau of Plant Industry, U. S. Department of Agriculture.

[3] See INDIA RUBBER WORLD, July, 1942, p. 354.

[4] The numbers in parenthesis refer to "Literature Cited", which will appear at the end of each installment.

[5] See INDIA RUBBER WORLD, June, 1942, p. 356.

Fig. 9. Young Rubber with Interplanted Robusta Coffee on Jungle Land Subjected to the Ruinous "Clean-Clearing" Method Formerly Practiced Widely in the East. This Early Destruction of Organic Matter, Accompanied by Soil Erosion, Greatly Reduced the Productive Life of Rubber Plantings (South Sumatra, 1919)

R. C. Lorenz, Sept. 14, 1940

Fig. 10. Young Semi-Hedge Rubber Planting with Native *Calathea* Species Growing Naturally as a Ground Cover between the Rows, at Goodyear Speedway Estate, Cairo, Costa Rica

Fig. 11. Young Rubber in Semi-Hedge Planting with Miscellaneous Natural Vegetation as a Ground Cover, at Goodyear Speedway Estate

R. J. Seibert, Sept. 14, 1940

ments; while others will be transplanted to isolated seed gardens along with comparable *H. brasiliensis* for interspecies crossing and production of hybrid seed for future root stocks. The same or different gardens also will be available for tests of top-budding and the broader investigations pertaining to miscellaneous *Hevea* species referred to earlier in this paper.

Clearing and Preparing Land for Planting

In clearing jungle land for the planting of rubber without catch crops or intercrops the strip-clearing method, recently recommended in the East, is particularly suited to Latin America. The old method of "clean clearing" with complete burning of all debris, stumps, and even excavated larger roots resulted frequently in soil deterioration without prevention of root diseases for which it was advocated. (Figure 9.) According to the new method all existing trees and undergrowth more than two meters high are felled or slashed and piled between the rows. In districts subject to a long unbroken dry season and where the amount of debris presents a fire hazard to the young rubber, a light burn as soon as possible to avoid destruction of surface litter and humus may be necessary.

Strips two meters wide and about 6.5 meters apart, center to center, are clean-cleared for planting the trees. When hillsides or slopes on which erosion might occur are being planted, the strips should follow the contour at the same uniform distance apart. Felled logs or stones, if present, should be placed along the lower side of tree benches or terraces on very steep land to prevent soil wash. Short stakes are used to mark the measured position for each tree along the middle of the strip, and jungle stumps are dug out only where they interfere with proper spacing of the planting holes.

After planting, the row strips only are kept clean especially of coarse grasses which are deleterious to the growth of rubber. On the rest of the area natural vegetation is allowed to grow with periodic slashing at a height of one meter to two meters. All native creeping leguminous plants are encouraged, over other plants, especially shade-tolerating legumes which may persist after the rubber trees are large. Seeds of desirable species may also be sown in any bare spaces.

Many agriculturists of cooperating Latin American countries have visited the Speedway Estate of the Goodyear Rubber Plantations Co. near Cairo, Costa Rica. There may be seen an adaptation of the latest Far Eastern methods of land preparation combined with semi-hedge rubber plantings, as recommended in this paper. (See Figures 10 and 11.) Such field practices help to reduce the otherwise high labor costs of establishing rubber plantations.

A cooperative program of experiments on land preparation, planting, and other field methods is now being inaugurated on the Los Diamantes Experiment Farm near Guapiles, Costa Rica. Similar experiments are needed in other countries having different soils, jungle cover, and climatic conditions.

Planting

Recommended procedures for field planting of budded stumps are the same as for budwood multiplication gardens on which mimeographed instructions have been issued by this Department as well as by many of the cooperating countries. Other circulars describe the establish-

ment of nurseries so that neither of these subjects is discussed here. The semi-hedge type of planting, recommended spacing of the trees, and the number per hectare have been given under a preceding heading of "Clones Recommended for Commercial Planting",[6] for which this particular planting system is especially adapted.

Catch Crops and Cover Crops for Rubber

Catch crops are of especial importance to the small grower who must produce his own food and, if possible, some cash income during the three to four years before the planted rubber comes into bearing. If the land is not subject to serious erosion, catch cropping between the rows of rubber will do no harm, and often the attendant working of the soil is distinctly beneficial to growth of the young trees. In any case fairly clean clearing of the land and burning of debris are required.

Most of the common food crops may be planted between rubber. In native rubber districts of Sumatra and Borneo, a crop of upland rice is usually planted first and followed by banana, Casava, maize, various beans, sweet potatoes, or other local food crops until the shade from the rubber renders further production impractical. Then a shade-tolerating leguminous cover crop is sown, or merely the weeds and spontaneous *Hevea* seedlings and other natural undergrowth are allowed to grow. However a part of the new rubber planting may be devoted to cash crops such as *Derris cliptica*, lemon grass for oil, "Iles-Iles" (*Amorphophallus oncophyllus*) for production of mannan flour, and Casava (mandioca) for sale to starch factories.

For Latin America all of the above and many others are available for use as catch crops with rubber. However, just as with rubber itself, technical guidance and considerable investigation will be needed for successful development of these secondary, but highly important sources of cash income for the rubber grower. Each should be considered as a distinct agricultural industry in which the field phase merely utilizes the unoccupied and partly prepared land between the widely spaced rows of young rubber.

For the well-capitalized plantation enterprise catch crops may be of less importance so that consideration is given to the most economical maintenance of the plantings. A controlled, natural low-bush and vine type of soil cover supplemented by a planted cover crop not requiring much weeding will be the aim.

Many trials will be required to discover satisfactory cover crops for the various soils and climatic conditions of Latin America. An extended inquiry has failed to reveal local sources of commercial seed of even the best-known

[6] *Ibid.*, p. 353.

Fig. 12. Cover Crop of *Centrosema Pubescens* Planted Immediately after Clearing to Prevent Soil Erosion; Larger Rubber in Background. Although Tolerant of Shade, This Plant Is Not Widely Adapted (West Coast Sumatra, 1929)

Fig. 13. Part of Field of Figure 12 Showing One-Year Old Budded Rubber with Excellent Soil Coverage of *Centrosema*

Karl D. Butler

Fig. 14. Cover Crop of *Pueraria Javanica* under Eight-Year-Old Rubber on Fordlandia Plantation, Brazil

Fig. 15. Six-Year-Old Rubber with Permanent Interplanting of Robusta Coffee in Eastern Java; The Usual Low Type of Shade Tree over the Coffee Rows Is Not Seen in This Picture

kinds anywhere in the entire region. The production of such should prove a profitable business for a few enterprising farmers in each of the countries. Collections are being built up and experimental work conducted at the Canal Zone Experimental Gardens, and a small collection of species is now under observation at the cooperative field stations of this Department in Honduras and Haiti.

In Trinidad, Jack bean (*Canavalia ensiformis*) was widely used around 1917 as a cover crop for rubber. It was said to tolerate moderate shade, showed no disposition to climb the trees, and the dense growth stifled all weeds and grass. The heavy crop of beans also furnished a palatable human food.

Velvet bean (*Mucuna deeringiana*) is another possible cover crop with subsidiary value as a forage crop. Various soybeans should be tried, both for temporary soil-cover following other food crops and for the edible oil, with the press cake utilized for cattle food.

The standard cover crops for rubber in the Far East, such as *Calopogonium mucunoides*, *Centrosema pubescens* (see Figures 12 and 13), *C. plumieri*, and *Pueraria javanica* (see Figure 14) also deserve widespread trial in Latin America. The first three species are, of course, indigenous to Tropical America, and the *Centrosemas* are probably most shade tolerant of all.

Cover crops without accessory value, such as furnishing edible seeds, may be more expensive to maintain than their supposed soil-improvement value warrants. Some may even retard the growth of the rubber and suppress yields during a long dry season even though the row strip is kept free from growth and covered with a mulch of the slashings. Experimental comparisons of various species in the East have frequently given contradictory results. Without attempting to summarize the extensive publications, it may be stated that where cover crops have been difficult to maintain, a natural soil cover of spontaneous growth slashed back once or twice a year to a height of a meter has been found fully as satisfactory. However, singly or in mixture, the above-mentioned cover crops have sometimes greatly assisted in controlling the natural growths during the early years of the rubber planting.

Permanent Mixed Cropping

The interplanting of rubber with other tree crops is a long-established practice in some Far Eastern countries, especially in middle and eastern Java. It is usually confined to areas of fertile soil where labor is abundant. Both coffee and cacao have been used extensively in the past as intercrops between the rows of rubber. However rubber proved susceptible to the *Phytophthora* canker and pod rot of cacao which made that combination very undesirable. Thereafter kapok was substituted and proved a satisfactory combination with cacao, and coffee has continued as the principal intercrop for rubber.

The similarity of soil and climatic conditions of eastern Java, where mixed cropping is very successful, with that of several of the Latin American countries having a similarly pronounced dry season warrants serious consideration of the practice in at least certain districts of the latter region. Rubber could be interplanted in present coffee gardens below an elevation of 600 meters, or new gardens started with a mixture of both crops. Thus about half of the customary coffee shade trees would be replaced by the *Hevea* which would not only furnish necessary shade for the coffee, but a remunerative product of its own. It might be well, therefore, to discuss briefly the advantages and disadvantages of such a system.

The primary motive for mixed cropping is, of course, to divide the economic risk, but a most important secondary one is increased income from a given area of land. The extreme fluctuations in price of rubber during the two decades prior to stabilization under international agreement demonstrated the wisdom of those having more than one crop to rely upon.

There also are advantages of a biological nature from growing two or more widely different crop plants in the same soil, for example, coffee with a shallow root system between *Hevea* with a deep one. Coffee is said to be practically immune to white root rot (*Fomes lignosus*), a serious disease of *Hevea* in the East, so that when the crops are planted in rows, the coffee tends to prevent spread of the disease.

The chief disadvantage is generally a reduced yield from each crop compared with unmixed plantings. This is usually attributed to the necessarily wider spacing and consequently fewer plants of each crop per hectare (Figure 15). Under certain conditions, however, both light and root competition exert a depressing influence on yields. From the results of a comprehensive study of mixed rubber and coffee plantings in Java, Schweizer (*22*)[7] calculated rubber yields at 70 to 80% and coffee from 40 to 80% of those of unmixed plantings. With age the coffee showed a decline, although after 25 years under rubber in some gardens, it still yielded 40% of pure stands.

Coffee requires plenty of sun during the flowering and fruiting seasons, and the normal "wintering" or leaf-fall of *Hevea* may provide this added light if wintering occurs at the proper time. The two conditions are more apt to coincide in districts with a single pronounced dry season, such as the Pacific slope of Mexico, Guatemala, and other similar areas where "low land" coffee is now cultivated. Another important factor is the value of *Hevea* as a windbreak for coffee in such mixed stands. Some cooperative experiments already have been arranged to study the various questions involved.

Questions regarding spacing of rows of rubber to be planted in existing coffee gardens both for eventual conversion to pure rubber and a permanent mixed planting have been alluded to in a foregoing discussion of a "Rotation Planting Scheme."[7] In the complete absence of data from the Western Tropics no specific row spacings can be suggested. In any trials, however, the rubber should be spaced in hedge-type rows to permit satisfactory thinning with age. The rows of coffee should not be nearer than two to three meters from the rubber and should be provided with a low-growing type of permanent shade tree.

Summary

This paper presents some details of procedure in fostering a rubber-growing industry and a discussion of problems under investigation in the cooperative intergovernmental program outlined in 1941 by E. W. Brandes.

Measures are proposed and emphasis is placed on assistance to the small grower or one-family type of rubber planting. The use of selected resistant clones assures control of leaf blight and a yield enabling competition with other sources of rubber supply.

A diagrammatic outline is given of the intergovernmental selection and breeding project for the development of resistant, superior-yielding, and more widely adaptable clones for all cooperating countries. This involves crossings between the best breeding, although highly susceptible clones of the East with the most resistant and high-

[7] *Ibid.*, p. 356.

est yielding Amazonian selections. The individual contributions and mutual interdependence of all countries for most rapid advancement of this project are emphasized.

The three cooperative field stations and other rubber research headquarters of this Department in Latin America are described with respect to their functions as centers for research and for the development, propagation, and distribution of improved clones to all countries. Clones recommended for breeding gardens for production of naturally cross-pollinated seed are listed and suggestions for such plantings are presented.

Many new clones already have been established from resistant selections following blight-inoculation tests in nurseries planted with hybrid clonal seed imported by this Department from the Philippines and Liberia. Because of their assured yield, these selections are immediately available for commercial planting. Thus far, however, the degree of resistance has been lower than that of the Ford-Brazilian clones. Seed importations from promising Liberian clones remain to be tested.

For commercial plantings in blight-free areas, a mixture of three groups of clones is recommended, e.g., (1) Goodyear Far Eastern proved clones which are tolerant of leaf blight in favorable areas; (2) Latin American clones selected from clonal hybrid-seedling nurseries and possessing moderate resistance to leaf blight; and (3) Ford-Brazilian clones possessing very high resistance to leaf blight. In areas infested with leaf blight the first group should be omitted unless climatic conditions have been found to prevent serious spread of the disease.

Closely spaced plantings of a mixture composed of some half-dozen clones from these different groups provide insurance against leaf blight, high initial yields, and, with selective thinning, satisfactory production at maturity. A semi-hedge type of planting with an initial density of about 680 trees per hectare (273 per acre) is recommended as most suitable for the present and prospective planting material, as well as being most adaptable for intercropping.

Until the clones of Groups 2 and 3 have been sufficiently multiplied in the blight-free countries for the suggested mixed plantings, several alternative procedures are suggested for safe and immediate utilization of the Group 1. These include trials of top-budding with highly resistant seedling material and a rotational planting scheme.

Suggestions are given for immediate establishment of seed gardens in all countries to provide an abundant future source of blight-resistant, home-grown seed for production of root stocks.

Methods of clearing land, planting, and the intercultivation of food and subsidiary cash crops until the rubber comes into bearing, or the use of leguminous cover crops and control of spontaneous natural vegetation for soil conservation and prevention of erosion are all briefly reviewed in relation to the most recent experimental work in the East.

Permanent mixed cropping of rubber with coffee appears sufficiently promising to warrant trial in several of the countries possessing suitable conditions. The absence of local information and consequent need of experimentation on this and many other subjects of importance in the establishment of a successful rubber culture in Latin America are emphasized as major projects for the cooperative intergovernmental research program.

Literature Cited

(24) D. Tollenaar, "De Belangrijkheid van Het Onderstamvraagstuk voor de Rubbercultuur", *Bergcultures*, July 26, 1941, pp. 1014-19.

Glycerine Helps Preserve Rubber

For many years glycerine has been widely recognized as a serviceable material for maintaining rubber items in their resilient state, according to Georgia Leffingwell and Milton A. Lesser, of the research staff of the Glycerine Producers' Association, 11 W. 42nd St., New York, N. Y., whose investigations have included both United States and foreign literature. They report that Prinz's *Dental Formulary* considers a solution of 8% glycerine, 8% alcohol, and water to make 100% to be one of the few which have proved of practical value for preserving vulcanized rubber articles.

Newer mixtures[1] for preserving the suppleness and elasticity of rubber goods contain lemon juice as an active ingredient. The range of proportions are: 85-95 parts of glycerine and 5-15 parts of lemon juice. Resilience is retained by rubbing the surfaces with the mixture or by steeping the articles in it.

Manufacturers of rubber tubing often finish their products by applying a thin coating of glycerine diluted with water or alcohol, or both. It is imperative that every trace of the diluent be permitted to evaporate or drain away before the goods are stored. The glycerine, because of its higher boiling point (290° C.) remains to continue its beneficial action.

Other industrial rubber processes similarly utilize glycerine. K. E. Malkins recommended[2] that glycerine be used inside tire water bags to prevent aging. In an older process[3] it was advocated that a solution of glycerine be injected into air bags, such as those used in vulcanizing tires, to protect their inner surfaces from oxidation. Glycerine is also used as a substitute for oil and grease lubricants for moving or supporting rubber parts, for it not only reduces friction, but helps to maintain resiliency. A mixture of glycerine and alcohol (1:2) is widely employed as a lubricant for rubber shackles on automobiles. Dispersions of graphite in glycerine are also standard rubber lubricants. One typical recipe[4] specifies a mixture of 50 parts of glycerine, 50 parts of water, and 0.2-part of fine powdered graphite as a lubricant for rubber bearings.

Lubricants for rubber catheters generally consist of fairly simple mixtures of glycerine, a vegetable gum, water, and a preservative. Dr. Leffingwell and Mr. Lesser suggest that the studies of Aquadro and Barbour[5] clearly demonstrate the preservative qualities of glycerine for such rubber specialties, as compared with the deteriorating effects of mineral oil.

[1] British patent No. 489,103 and French patent No. 816,466.
[2] *Caoutchouc & Rubber*, 3, 86 (1939).
[3] U. S. patent No. 1,818,937.
[4] U. S. patent No. 2,083,176.
[5] *Am. J. Nursing*, 38, 424 (1938).

Synthetic Rubber Base Coatings

Valco liquid rubber coatings, manufactured by the Chemical Enamels Co., have a chemically treated synthetic rubber gum base. These coatings are said to inhibit rust action and to have effectual resisting qualities to alkalies, alcohol, oils, greases, corrosive gases, water, and inorganic acids. They are not recommended for resistance against strong organic acids. These coatings are also, reportedly, fire retardant and resistant to electrochemical action. They are of a fast-drying type and available in 12 colors for a variety of uses including metal, concrete, masonry, and wood products.

EDITORIALS

Rubber—the Official Football Of the Amateur League

POLITICS and the war effort do not mix, and they never have. When the issue is sharply defined, it is the war effort that suffers.

The rubber situation as it stands today in Washington is a case in point—a political tower of Babel. The men who have lived with rubber through decades or who have for some years been in the forefront of synthetic development are shunted aside so that the self-appointed "rubber experts" can fill the "Congressional Record" and the daily press with statements, the inaccuracies of which are an insult to the intelligence of those who know the situation as it exists.

Today—over eight months after Pearl Harbor—the rubber program still appears to be in a state of chaos. The chairman of the War Production Board has announced that he has taken personal charge, and a new committee of chemical experts headed by Ronald B. Keyes, of the University of Illinois, head consultant of the Chemical Branch of the WPB, has been named to advise the Board on the relative merits of the competing processes involved in the manufacture of synthetic rubber.

Let us hope now that a strong position will be taken by the War Production Board, backed by a personal appeal to the critics and publicity seekers by the President, if necessary, while this "All-Out Review and Reorganization of the Rubber Program" is under way. What is badly needed at this time is a moratorium on the activities of the pressure groups who have been wasting the time and discouraging the efforts of the administrators, chemists, and engineers who are trying to provide a solution to this vital problem of maintaining a supply of rubber for our war effort in the shortest possible time and with the least possible interference with other essential programs of war production.

"Business as usual" is out. The solution of the rubber problem is a challenge to the abilities of the best men we have in the fields of procurement and use of natural rubber, reclaimed rubber, and the production and use of synthetic rubber. Politics and personal greed have nothing they can offer but dangerous interference to the tremendous effort required to provide an adequate supply of rubber and so prevent a serious reverse in our war program.

What if one part of industry temporarily does seem to have a major position in the synthetic rubber program? If by virtue of the progress made in this position it will mean that enough rubber will be available when we reach the point in our military operations where its lack would mean the difference between victory and defeat, who cares? The government owns the synthetic rubber plants and raw materials plants being built, and it is not conceivable that a high-cost product requiring continued government subsidy and returning abnormal profits to any one branch of industry will continue to be made if a low-cost product of equal quality can be made by another branch or branches of industry.

Therefore the patriotic thing to do is to concentrate on getting the rubber and forget politics and personal self-interest and let the problem of who makes the most rubber after the war depend on who can make it at the lowest cost and of the best quality.

How to Reclaim Synthetic Rubber?

THE above title is premature, but is designed to call attention to the fact that information on this subject is very meager and will be very much sought after within a year or two. The need of some sort of action is therefore apparent.

Reclaimers are processing a certain amount of synthetic rubber in their present equipment, but quite a difference in procedure is involved, and considerable difficulty is reported when mixtures of natural and synthetic rubber are reclaimed. A research program sponsored by one of the leading reclaiming companies has been under way for two years at Massachusetts Institute of Technology, investigating methods of reclaiming the various synthetic rubbers, and this together with the experience and knowledge being gained by the various other reclaimers will represent the latest information on this subject.

It is important that right now before our production of synthetic rubber reaches large proportions that plans be made for the classification of scrap rubber containing synthetic rubber either wholly or in part, that reclaiming methods applicable to the various types of synthetic rubber be thoroughly investigated, and that classification and best uses for the finished synthetic rubber reclaim be developed. If an organized effort is not made on a national basis before large amounts of synthetic rubber are used in rubber manufacture, the effect on the properties of rubber scrap collected and on the processes used in the reclaiming plants may result in a bad tie-up of the facilities for the production of reclaimed rubber at a time when reduction of the output might have a serious effect on the war effort.

A pooling of information on ideas and methods for the proper reorganization of the scrap collecting and reclaiming industries in the light of the rapidly changing nature of the materials being used in the manufacture of rubber products is indicated. This work, the beneficial effects of which would be felt by the whole rubber industry, should be under the supervision of the WPB with the cooperation of the rubber reclaimers and national waste dealers associations. When completed, it should provide the necessary standardization and regulation to prevent loss of time and production in the reclaiming industry which otherwise might occur some months hence and which we cannot afford.

What the Rubber Chemists Are Doing

New Classifications for Rubber Compounds by Joint A.S.T.M. and SAE Committees

RUBBER experts, automotive engineers, and representatives of the nation's armed forces have in the past several months reduced from several hundreds to less than 100 the number of rubber compounds, classifications, and specifications and have established physical properties and standard tests for each compound to facilitate use for industrial purposes and conserve rubber stocks. The system of classifications, designed to conserve rubber by enabling manufacturers to select compounds whose properties are known to meet requirements of specific uses, and to make effective use of alternative compounds, covers 57 synthetic and 40 natural rubber compounds.

In preparing the classifications, specifications, and standard tests, standard A.S.T.M. test procedure was followed with few exceptions. It is proposed, as time and war work permit, to develop additional standard laboratory tests for other properties and characteristics and also to devise quick, reliable acceptance tests and test-instruments which may be utilized in factories either for bath or mechanical testing.

PROPOSED CLASSIFICATION OF NATURAL RUBBER AND QUALITIES FOR AUTOMOTIVE USE

As revised May 19, 1942—Proposal No. 3

Classification Number	Hardness A.S.T.M. D-314-39	Minimum Tensile Strength, psi A.S.T.M. D-412-41	Minimum Elongation, %	20% Load Deflection, psi A.S.T.M. D-575-40T	Hardness Shore Durometer Approximate
R300B	150±20	....	...	.....	30
R309	150±20	900	500	.....	30
R315	150±20	1500	600	70±10	30
R320	150±20	2000	600	70±10	30
R330	150±20	3000	700	70±10	30
R400B	105±15	....	....	.....	40
R405	105±15	500	300	.....	40
R409	105±15	900	500	.....	40
R415	105±15	1500	500	100±15	40
R420	105±15	2000	500	100±15	40
R430	105±15	3000	600	100±15	40
R500B	75±10	....	...	.....	50
R506	75±10	600	300	.....	50
R509	75±10	900	300	.....	50
R515	75±10	1500	400	140±20	50
R525	75±10	2500	500	140±20	50
R535	75±10	3500	600	140±20	50
R600B	55± 8	....	...	.....	60
R606	55± 8	600	300	.....	60
R609	55± 8	900	300	.....	60
R615	55± 8	1500	350	195±30	60
R620	55± 8	2000	400	195±30	60
R625	55± 8	2500	450	195±30	60
R635	55± 8	3500	550	195±30	60
R700B	40± 7	....	...	.....	70
R703	40± 7	300	100	.....	70
R704	40± 7	400	150	.....	70
R706	40± 7	600	200	.....	70
R709	40± 7	900	250	.....	70
R715	40± 7	1500	300	285±50	70
R720	40± 7	2000	350	285±50	70
R730	40± 7	3000	450	285±50	70
R804	28± 7	400	100	.....	80
R806	28± 7	600	150	.....	80
R809	28± 7	900	200	.....	80
R812	28± 7	1200	250	.....	80
R820	28± 7	2000	250	450±75	80
R825	28± 7	2500	300	450±75	80
R907	13± 7	700	75	.....	90
R915	13± 7	1500	200	.....	90

EXPLANATION OF PROPOSED RUBBER PROPERTIES CHART

As revised May 19, 1942—Proposal No. 3.

Prefix Letter "R" of Classification Number Indicates "Rubber."

Use

Suffix letter *A*[1] indicates general-purpose rubber compounds for which compression set or special aging is not required or designated.

Suffix letter *B*[1] indicates rubber compounds with maximum compression set requirements.

Suffix letter *C*[1] indicates rubber compounds adapted for outdoor aging.

Physical properties specified in the chart are based on test specimens having an equivalent cure of the part in question rather than the optimum cure and the physical properties of the part correlated with the test specimens.

Hardness

First digit of Classification Number indicates the approximate Durometer hardness.

Hardness specified shall be determined by A.S.T.M. test method D-314-39.

Tensile Strength

Second and third digits of Classification Number indicate minimum strength.

Tensile and elongation specified shall be determined by A.S.T.M. test method D-412-41.

Load Deflection

Load deflection specified shall be determined by A.S.T.M. test method D-575-40T.

Compression Set

On Compounds R300B, R400B, R500B, R600B, and R700B the compression set shall not exceed 25%. When *B* designation is used on any other compound, the compression set shall not exceed 50%.

Attention is called to the new A.S.T.M. test method D-395-40T (Method B) which is based on compressed thickness of specimen rather than the original thickness. Maximum compression set specified shall be determined by the new method.

Research is in progress on the use of other limits of time and temperature. As a reference check A.S.T.M. test procedure D-395-40T method B may be extended to 70 hr. with comparable limits or compression set.

Aging

Tensile and elongation deteriorations shall not exceed 15% of original values of any compounds after 72 hr. at 158° F. as per A.S.T.M. test method D-573-41, accelerated aging.

Color

Color is not specified in any of the above classifications, but should be black whenever possible and without bloom that may have an adverse effect on the aging of the compound.

[1]These suffix letters may be used singly or in combination, as applying to any of the rubber stocks listed in the classification, depending upon requirements.

Natural Rubber Classification

The classification and test requirements for natural rubber stocks are recommended for automotive and general mechanical applications except tires, and in cases where good noise and vibration absorption properties and resiliency are desired. They were derived from data contributed by the rubber and mechanical industries and provide uniformity in testing according to A.S.T.M. methods that were previously lacking. The classification has been approved by the S.A.E. General Standards Committee.

Synthetic Rubber Classification

The approved classifications for synthetic rubbers, which has also been approved by SAE General Standards Committee, depend upon their relative change in volume after immersion in a chosen test fluid. By this scheme current synthetic rubbers will be grouped in the following classifications:

Classification A

"Thiokol" Type D
"Thiokol" Type F
"Thiokol" Type FA

Classification B

Chemigum
Hycar OR
Neoprene Type ILS
Perbunan
"Thiokol" Type RD

Classification C

Neoprene Type E
Neoprene Type FR
Neoprene Type GN
Neoprene Type M

Every Classification is identified by two letters, followed by three numerals. The first letter is S (standing for "synthetic") followed by A, B, or C, depending upon the grouping as just described. Each Classification (A, B, or C) is further subdivided depending upon the A.S.T.M. hardness and the original tensile strength. The first numeral refers to the hardness (3 for the 25 to 35 durometer range, 150 A.S.T.M. hardness; 4 for the 35 to 45 durometer range, 105 A.S.T.M. hardness, and so on); the next two numerals refer to the tensile strength (06 standing for 600 psi, 10 for 1000 psi, and so on). Thus S.A.-607 represents a synthetic-rubber composition of Classification A having a Shore durometer hardness of 55 to 65 (55 A.S.T.M. hardness) and a minimum original tensile strength of 700 psi. In Classifications B and C appear classification numbers ending in 00. These refer to compositions designed for low compression set; the tensile strength and elongation are not specified.

In addition to the original tensile strength and hardness, the tests shown in Tables A, B, and C are necessary to specify correctly common synthetic rubber compositions. These additional tests (described under "Testing Procedure") consist of the measurement of the elognation and the compression set; the change in tensile strength, elongation, and hardness after oven aging; and change in tensile strength, durometer, and volume after oil aging.

These tests are performed in accordance with tentative and standard A.S.T.M. methods with exceptions to be described later. The Subcommittee believes that these exceptions are necessary for the testing of synthetic rubber compositions, but not necessary for the testing of natural rubber vulcanizates.

These variations from standard A.S.T.M. testing methods were made for the following reasons:

Compression Set (A.S.T.M. D-395-40T, Method B) In the interest of uniformity in testing, a definite deflection has been specified for each hardness range. The A.S.T.M. method allows a deflection range for each hardness range.

Oven Aging (A.S.T.M. D-573-41) For Classification B and C, a temperature of 100° C. is preferable to the standard 70° C. because the higher test temperature more closely approximates service temperatures for these classifications. The A.S.T.M. method does not specify a definite time interval. Since an economy of testing time is desirable, the Subcommittee suggests a 70-hr. period. This amounts to a three-day test, less two hr., which allows sufficient time during the working day for inspection of samples after aging.

Oil Aging (A.S.T.M. D-471-40T) The temperatures suggested by the Subcommittee are allowed in the A.S.T.M. method. The special aging period was selected for the reasons given in the preceding paragraph.

The immersion medium described by the *aniline point* and *viscosity*, is readily available. Conformity to the aniline-point range is important since this constant predicts the swelling power of the oil. The oil described represents a fluid having the probable maximum swelling power of common commercial petroleum-derived oils.

In the A.S.T.M. method the tensile strength after immersion is calculated by means of an A.S.T.M. formula which is a combined function of volume change, after immersion, and the aged tensile strength based on the original cross-sectional area of the test specimen. To prevent erroneous conclusions, the Subcommittee feels that this formula should be deleted and the tensile strength after oil aging be calculated on the basis of the original unaged cross-sectional area. This is particularly important in the

TABLE A—S.A.E.-A.S.T.M. SYNTHETIC-RUBBER SPECIFICATION STANDARDS

Classification A

(See S.A.E.-A.S.T.M. Modified Testing Procedure for Methods of Testing)

Classification Number	A.S.T.M. Hardness	Approximate Shore Durometer	Minimum Tensile Strength, psi	Minimum Elongation, %	Maximum Compression Set, %	Oven Aged			Oil Aged		
						Tensile (% Change)	Elongation (% Change)	Durometer (Points Change Limits)	Volume (% Change Limits)	Tensile (% Change)	Durometer (Points Change Limits)
SA-302	150 ± 20	30	200	500	No test		No test		—15 to 5	—20	—5 to 10
SA-403	105 ± 15	40	300	500	"		"		— 5 to 3	—20	—5 to 5
SA-506	75 ± 10	50	600	500	"		"		— 3 to 3	—20	—5
SA-607	55 ± 8	60	700	400	"		"		— 3 to 3	—20	—5
SA-706	40 ± 7	70	600	400	"		"		— 3 to 3	—20	—5
SA-709	40 ± 7	70	900	300	"		"		— 3 to 3	—20	—5
SA-809	28 ± 7	80	900	200	"		"		— 3 to 3	—20	—5
SA-910	13 ± 7	90	1000	100	"		"		— 3 to 3	—20	—5

TABLE B—S.A.E.-A.S.T.M. SYNTHETIC-RUBBER SPECIFICATION STANDARDS

Classification B

(See S.A.E.-A.S.T.M. Modified Testing Procedure for Methods of Testing)

Classification Number	A.S.T.M. Hardness	Approximate Shore Durometer	Minimum Tensile Strength, psi	Minimum Elongation, %	Maximum Compression Set, % Method B	Oven Aged			Oil Aged		
						Tensile (% Change)	Elongation (% Change)	Durometer (Points Change Limits)	Volume (% Change Limits)	Tensile (% Change)	Durometer (Points Change Limits)
SB-305	150 ± 20	30	500	400	50	—20	—50	0 to 20	—15 to 25	—20	—10 to 20
SB-309	150 ± 20	30	900	500	50	—20	—50	0 to 20	—15 to 25	—20	—10 to 20
SB-405	105 ± 15	40	500	400	45	—20	—50	0 to 20	—15 to 25	—20	—10 to 20
SB-410	105 ± 15	40	1000	500	45	—20	—50	0 to 20	—15 to 25	—20	—10 to 20
SB-415	105 ± 15	40	1500	500	45	—20	—50	0 to 15	—15 to 25	—20	—10 to 15
SB-400	105 ± 15	40	...	...	25	...	...	0 to 15	—15 to 25	...	—10 to 15
SB-508	75 ± 10	50	800	400	40	—20	—50	0 to 15	— 5 to 25	—20	—10 to 15
SB-515	75 ± 10	50	1500	500	40	—20	—50	0 to 15	— 5 to 25	—20	—10 to 15
SB-520	75 ± 10	50	2000	500	40	—20	—50	0 to 10	— 5 to 25	—20	—10 to 10
SB-500	75 ± 10	50	...	...	25	...	...	0 to 10	— 5 to 25	...	—10 to 10
SB-608	55 ± 8	60	800	300	35	—20	—60	0 to 15	— 5 to 25	—20	—10 to 10
SB-617	55 ± 8	60	1700	400	35	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-625	55 ± 8	60	2500	500	35	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-600	55 ± 8	60	...	...	25	...	...	0 to 10	— 5 to 25	...	—10 to 10
SB-710	40 ± 7	70	1000	300	30	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-720	40 ± 7	70	2000	300	30	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-730	40 ± 7	70	3000	400	30	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-700	40 ± 7	70	...	...	25	...	...	0 to 10	— 5 to 25	...	—10 to 10
SB-804	28 ± 7	80	400	100	30	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-810	28 ± 7	80	100	150	30	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-820	28 ± 7	80	2000	150	30	—20	—60	0 to 10	— 5 to 25	—20	—10 to 10
SB-902	13 ± 7	90	200	50	40	—20	—60	0 to 5	— 5 to 25	—20	—10 to 5
SB-910	13 ± 7	90	1000	100	30	—20	—60	0 to 5	— 5 to 25	—20	—10 to 5

TABLE C—S.A.E.-A.S.T.M. SYNTHETIC-RUBBER SPECIFICATION STANDARDS

Classification C

(See S.A.E.-A.S.T.M. Modified Testing Procedure for Methods of Testing)

Classification Number	A.S.T.M. Hardness	Approximate Shore Durometer	Minimum Tensile Strength, psi	Minimum Elongation, %	Maximum Compression Set, % Method B	Oven Aged			Oil Aged		
						Tensile (% Change)	Elongation (% Change)	Durometer (Points Change Limits)	Volume (% Change Limits)	Tensile (% Change)	Durometer (Points Change Limits)
SC-305	150 ± 20	30	500	500	70	—15	—40	15	100 to 150	—75	—30 to —10
SC-310	150 ± 20	30	1000	500	70	—15	—40	15	100 to 150	—75	—30 to —10
SC-320	150 ± 20	30	2000	500	70	—15	—40	15	100 to 150	—75	—30 to —10
SC-405	105 ± 15	40	500	500	65	—15	—40	15	90 to 140	—70	—35 to —15
SC-415	105 ± 15	40	1500	500	65	—15	—40	15	90 to 140	—70	—35 to —15
SC-425	105 ± 15	40	2500	500	65	—15	—40	15	90 to 140	—70	—35 to —15
SC-400	105 ± 15	40	...	...	20	...	...	15	90 to 140	...	—35 to —15
SC-507	75 ± 10	50	700	300	60	—15	—40	15	80 to 130	—60	—40 to —20
SC-512	75 ± 10	50	1200	300	60	—15	—40	15	80 to 130	—60	—40 to —20
SC-520	75 ± 10	50	2000	400	60	—15	—40	15	80 to 130	—60	—40 to —20
SC-530	75 ± 10	50	3000	500	60	—15	—40	15	80 to 130	—60	—40 to —20
SC-500	75 ± 10	50	...	...	20	...	...	15	80 to 130	...	—40 to —20
SC-608	55 ± 8	60	800	300	55	—15	—40	15	70 to 120	—50	—50 to —20
SC-614	55 ± 8	60	1400	300	55	—15	—40	10	70 to 120	—50	—50 to —20
SC-620	55 ± 8	60	2000	300	55	—15	—40	10	70 to 120	—50	—50 to —20
SC-630	55 ± 8	60	3000	400	55	—15	—40	10	70 to 120	—50	—50 to —20
SC-600	55 ± 8	60	...	...	20	...	...	10	70 to 120	...	—50 to —20
SC-707	40 ± 7	70	700	200	50	—15	—40	10	60 to 110	—50	—50 to —25
SC-717	40 ± 7	70	1700	200	50	—15	—40	10	60 to 110	—50	—50 to —25
SC-725	40 ± 7	70	2500	300	50	—15	—40	10	60 to 110	—50	—50 to —25
SC-700	40 ± 7	70	...	...	20	...	...	10	60 to 110	...	—50 to —25
SC-804	28 ± 7	80	400	100	50	—15	—40	10	50 to 100	—30	—50 to —30
SC-808	28 ± 7	80	800	100	50	—15	—40	10	50 to 100	—30	—50 to —30
SC-815	28 ± 7	80	1500	100	50	—15	—40	10	50 to 100	—30	—50 to —30
SC-902	13 ± 7	90	200	50	50	—15	—40	5	40 to 90	—30	—50 to —30
SC-910	13 ± 7	90	1000	100	50	—15	—40	5	40 to 90	—30	—50 to —30

case of compositions which may suffer a decrease in volume as a result of oil immersion.

The proposed tests and limits form primary specifications and are intended merely to describe common synthetic rubber compositions. Undoubtedly, additional requirements will be needed adequately to specify synthetic rubber for special service applications, such as those involving resistance to aromatic fuels, flexing, stiffening at low temperatures, ozone, and so on.

It, therefore, will be the further function of Subcommittee V to investigate and develop suitable test methods for these special requirements. The additional special tests to be considered by the Subcommittee are for:

1. Low temperature to —70° F.
2. High temperature to +350° F.
3. Aromatic fuels.
4. Antifreeze and coolant.
5. Extraction.
6. Ozone.
7. Weather—ultra-violet.
8. Flame.
9. Tear.
10. Abrasion.
11. Flexing.
12. Product application.

The limits or specification of these tests will be determined by each user for specific applications.

To summarize: For example, if a specification for coolant hose having a neoprene cover and a Hycar tube is requested, it will be written as follows:

a. Cover to be: SC-717.
b. Fabric and number of plies: per user's discretion.
c. Adhesion of plies, and so on: per user's discretion.
d. Tube to be: SB-608 plus No. 4 test and limitations.
e. Burst strength: per user's discretion.

Should a specification for an aircraft diaphragm used in aromatic fuel be required:

a. SB-520.
b. Test 1 and user's limitations.
c. Test 3 and user's limitations.
d. Test 5 and user's limitations.

TESTING PROCEDURES

1. *Tensile and Elongation*
A.S.T.M.: D-412-41.

2. *Compression Set*
A.S.T.M.: D-395-40T: Method B.
Following exceptions:
Deflections of various hardness to be limited as per Table 1:

Table 1

Durometer	Deflection (% of Original Thickness)
30	40
40	40
50	30
60	30
70	25
80	25
90	25

3. *Oven Aging*
A.S.T.M.: D-573-41.
Following exceptions:
Classification A: 70 hr. at 70° C.
Classification B and C: 70 hr. at 100° C.

4. *Oil Aging*
A.S.T.M.: D-471-40T.
Following exceptions:
a. Classification A: 70 hr. at 70° C.
Classification B and C: 70 hr. at 100° C.
b. Oil to be Rubber Process type:
Aniline Point: 70° C., ±2° C. (A.S.T.M. D-611-41T).
Viscosity: 150 sec., ±10 sec. at 100° F. (A.S.T.M. D-88-38).
c. Tensile: Delete tensile-volume formula under section 10-c and base calculations on original unaged cross-sectional area.

Committee Members

The classifications are to be recommended to the WPB for promulgating in the war conservation program. Later, it is believed, this work, carried on under the direction of the joint SAE-A.S.T.M. Technical Committee A on Automotive Rubber and two subcommittees, will facilitate the adaptation to thousands of new industrial uses of both natural and synthetic rubber. L. A. Danse, metallurgist, Cadillac Motor Car Division, General Motors Corp., Detroit, Mich., is chairman of the joint technical committee and J. D. Morron, United States Rubber Co., Detroit, is secretary.

Classifications for natural rubber were developed by Subcommittee IV under the chairmanship of W. J. McCortney, engineering division, Chrysler Corp., Detroit. J. C. Dudley, also of Chrysler, is secretary. Classifications for synthetic rubber are the work of Subcommittee V, of which J. H. Doering, of Ford Motor Co., Dearborn, Mich., is chairman, and J. V. Hendrick, of Chrysler, secretary. Members of Subcommittee IV are: C. J. Cleary, Wright Field, Dayton, O.; Lt. Com. J. E. Sullivan, Bureau of Aeronautics, Washington, D. C.; A. W. Carpenter, War Production Board, Washington; M. Achterhof, Ohio Rubber Co., Willoughby, O.; E. J. Kvet, Baldwin Rubber Co., Pontiac, Mich.; H. L. Ebert, Firestone Tire & Rubber Co., Akron, O.; B. Steinfeld, Republic Rubber Co., Youngstown, O.; E. J. Kimmich, Goodyear Tire & Rubber Co., Akron; C. E. Carlson and H. Wening, Inland Mfg. Co., Dayton; C. E. Zwal, Chevrolet Division, and A. J. Kearfott, Research Division, both of General Motors; W. H. Graves, Packard Motor Car Co., Detroit; B. P. Resinger, B. F. Goodrich Co., Akron; E. J. Schwartz, Republic Rubber, Detroit; and Messrs. Doering and Morron. Members of Subcommittee V are: D. T. Booth, Wright Aeronautical Corp., Paterson, N. J.; C. J. Cleary, Wright Field; M. J. De France, Goodyear; D. F. Fraser, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; I. E. Lightbown, Stanco Distributors, Inc., New York, N. Y.; S. M. Martin Jr., Thiokol Corp., Trenton, N. J.; W. D. Parrish, Hycar Chemical Co., Akron; P. Veohl, United States Rubber; and Messrs. Ebert, Kearfott, and Sullivan.

SAE War Production Meeting

SAE will hold a War Production-Engineering Meeting and Engineering Display in the Book-Cadillac Hotel at Detroit, January 11 to 15, 1943, replacing its 1943 annual meeting with this specialized war event. Development of the program, now in the formative stage, will be governed largely by the needs of the war program.

Emergency Specification for Fire Hose

THE Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill., has prepared and published an Emergency Alternate Specification for Cotton, Rubber-Lined Fire Hose to conform to manufacturers' limitations set forth in WPB rubber restriction order M-15-b and its amendments. It details the requirements of the emergency specifications and tests therefor for 2½-inch double-jacketed fire hose and tabulates the requirements for other types and sizes. The specification is designed to provide a fire hose serviceable for several years although it has not been demonstrated that the new hose is equal in serviceability to that labeled by Underwriters' Laboratories, Inc., under the old and more stringent specification. The new specification also accomplishes some expediting of the factory testing program.

A.S.T.M. Rubber Committee Adopts New Tests

THE forty-fifth annual meeting of the American Society for Testing Materials, held June 22-26 at Atlantic City, N. J., was attended by 1,376 members. About 200 committee meetings were held. More than 55 new tentative standards were approved for publication as tentative, and some 70 existing tentative specifications are to be referred to the Society letter ballot for adoption as standard. The combined Book of Standards to be issued in November will include some 1,100 specifications, test methods, and recommended practices. About 50 specifications have been affected by emergency alternate provisions designed to expedite procurement or to conserve strategic materials necessary for the war effort. A number of emergency specifications have been issued.

Committee D-11 on Rubber and Rubber Products approved for publication a test for indentation of rubber by means of the durometer. Instruments investigated have not proved to possess all the characteristics desired in hardness testing, but the Committee feels that standardization and calibration of durometers will materially assist in accomplishing the objective sought and the new test is in line with this premise. Another action involved the existing tentative test for viscosity and total solids content of rubber cements which is to be adopted as an A.S.T.M. standard. The Committee will soon submit to the Society certain emergency provisions in the Specifications for Cotton Rubber-Lined Fire Hose (D 296) and also plans to perfect a new test covering compressed asbestos packings. Technical Committee A on Automotive Rubber (a joint project with the S.A.E.) is reducing the number of standard compounds and defining these compounds in terms of physical properties. A new sub-committee has been formed to assemble adequate information and devise tests to cover the physical properties of rubber and rubber-like materials at atmospheric temperatures.

The retiring president, G. E. F. Lundell, chief, Chemistry Division, National Bureau of Standards, in his annual address discussed chemical requirements and chemical analysis, outlining various observations based on his experience in this field during the past 25 years. Graham Edgar in the Edgar Marburg Lecture, "Gasoline—Past, Present, and Future", stressed those properties which have greatest bearing on the suitability of gasoline for internal combustion engines.

University Club (New York) Hears Howard and Frolich on Synthetic Rubber

FRANK A. HOWARD, president of the Standard Oil Development Co., and Per K. Frolich, research chemist of the same company, spoke on synthetic rubber before a record attendance of members and guests of the University Club, 1 W. 54th St., New York, N. Y., July 8.

Mr. Howard reviewed the rubber situation and emphasized our dependence on this material for the successful continuation of our military and essential civilian efforts. He mentioned the fact that a committee of leading engineers and scientists requested by the government to investigate all possible means of replacing rubber for tires had recently reported that since natural rubber was not available in unlimited quantities, emphasis should be placed on synthetic rubber-like materials since they were so far superior to wood, metal, springs, etc., for present-day wheeled transport that no adequate substitution other than synthetic rubber could be made. Mr. Howard also stated that tread wear in Buna S tires made to date was no faster and was even slower in some cases than with natural rubber tires and that results with Standard's Butyl rubber were reasonably good and that Butyl tires could be made at a much lower cost. For inner tubes Butyl rubber was reported as being superior to both natural rubber and Buna S with respect to permeability.

Dr. Frolich reviewed briefly the sources of raw material and method of manufacture of Buna S rubber and Buna N rubber and their properties. He demonstrated the polymerization of isobutylene, the main ingredient of Butyl rubber at the temperature of dry ice, using a gaseous catalyst and the coagulation of the synthetic latex to produce the solid rubber. He also demonstrated the resistance of Butyl rubber to the action of strong nitric acid in comparison with natural rubber and showed that although Butyl rubber had very poor rebound at room temperature, it was as lively as natural rubber when heated to 100° C. In contrast, natural rubber, when cooled with dry ice, had no more rebound than Butyl rubber at room temperature. In other words the temperature scale in which Butyl rubber has the proper rebound characteristics is considerably above normal room temperature, and when more is learned about the mechanics of what makes rubber bounce, a more lively Butyl rubber at ordinary temperatures may be produced.

The new Esso sound movie, "Rubber Turns Synthetic," was shown and gave further illustration of the production of synthetic rubber raw materials and synthetic rubber, its processing, compounding, and relation to military and civilian war effort.

A. S. C. News

Last Call for Essay Contest

MEMBERS of the New York Group, Rubber Division, A. C. S., who plan to submit papers in the 1942 Prize Essay Contest of the Group must submit titles to Fred E. Traflet, of the Pequanoc Rubber Co., Butler, N. J., and chairman of the New York Group, on or before August 19, 1942, and the essays themselves must be in Mr. Traflet's hands on or before September 9, 1942, to be considered. Papers should be technical in nature and must deal with materials and processes connected with rubber manufacturing. They may represent original work, the results of development or experimental work, or reviews of literature on rubber.

Remember—last call!

Chicago Group Holds Outing

THE Chicago Group, Division of Rubber Chemistry, A. C. S., held its annual outing June 27 at the Lincolnshire Country Club, Steger, Ill. About 120 members and guests enjoyed golf, bridge, swimming, and other diversions of the day followed by dinner and dancing. The committee in charge included: James P. Sheridan (New Jersey Zinc Sales), chairman; Francis Frost, Jr. (Frost Rubber); Kenneth Sidell (W. H. Salisbury); S. A. Davis (C. P. Hall); and A. H. Stein (H. Muehlstein). J. T. Adams (Sears, Roebuck) was presented with the Charles Muehlstein trophy given to the golfer having the low gross score. Many other prizes were awarded.

The Society of Chemical Industry has awarded its 1942 Chemical Industry Medal, granted each year to "a person making a valuable application of chemical research to industry", to Harrison E. Howe, chairman of the advisory committee of the WPB Chemical Section and editor of *Industrial and Engineering Chemistry*.

Neoprene Latex for General Compounding

NEOPRENE LATEX TYPE 571 has recently been developed by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., as a result of experimental work to find a method of making latex more rapidly than was possible through existing processes. It is similar to, but slightly more alkaline than Neoprene Latex Type 57 for which it may be substituted in most applications. Both are 50% latices of about the same viscosity and stability; both yield similar compounds. They may be used in the same way in the manufacture by the usual processes of articles consisting wholly or in part of neoprene. Cured films and coatings have nearly the same tensile strength, hardness, permanent set, and resistance to tear, aging, and oils and water. Type 571 is light buff-gray in color and has a more pungent odor than its forerunner. Uncompounded, it does not wet glass or smooth surfaces so well as the uncompounded Type 57; the compounded latices are about equal in wetting power. The curing of both types of films is the same. Normally the best cure for both is 30 minutes at 140° C.; they may be cured in hot air or in steam.

Loading for Insulating Compounds

MILLIMAR is an organic low dielectric constant loading material for use particularly with electrical insulating rubber compounds. It is a special form of Gilsonite, easily incorporated in rubber, which retains such desirable Gilsonite properties as low capacitance, low moisture absorption, and high modulus. The material is said to be desirable for imparting good electrical and processing characteristics to low rubber content compounds and to produce drier and firmer uncured stocks than a corresponding loading of mineral rubber. It is available in 20-mesh for easy handling without dusting from R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N. Y.

A.S.M.E. Hears Cole

A PAPER, "Applications and Unusual Physical Properties of Synthetic Rubbers", was presented by Otis D. Cole, research divison, Firestone Tire & Rubber Co., June 8, at the Cleveland meeting of the American Society of Mechanical Engineers. Mr. Cole considered Buna S, Buna N, neoprene, and Butyl types of synthetic rubbers and the variations in the properties of products made from them as caused by the ratios of the constituents of the various copolymers as well as the method of polymerization and the catalyst used. Butadiene copolymers were discussed most extensively, and comparisons were made with the other types to show the effect of certain compounding treatments upon their basic properties. Mr. Cole pointed out that, through the proper choice of polymers and plasticizers, Buna N types with good cold resistance could be obtained, but that in general good cold resistance and good oil or solvent resistance are not both obtained in the same Buna N compound. Data were given to show the efficiencies of various synthetic compounds compared to those of natural rubber compounds at high and low temperatures. Other data were presented to indicate that the proper choice of plasticizer is important for compounds to be used for sealing rings, oil-resistant gaskets, and special products.

Chemicals for Rubber

SEVERAL chemicals of interest to rubber manufacturers have been announced by Glyco Products Co., Inc.

Diglycol Stearate S (sp. gr. 0.96 at 25° C.) is a white wax-like solid with a 51°-54° C. (capillary tube) melting point. It disperses in hot water and is completely soluble in hot alcohol, oils, and hydrocarbons. A ½ to 2% dispersion is said to prevent tacking of raw rubber sheets. This chemical may be applied by spray or

(*Continued on page 478*)

New Machines and Appliances

Westinghouse Limiter Protects Power Systems

A NOISEPROOF limiter recently developed for factory power systems has in tests disconnected as much as 54,000 kilowatts of momentary short-circuit electricity. It is so designed that it will not go into action as soon as normal power is exceeded, but will wait until the short circuit power builds up to many times the normal amount because most cables can carry an added load for a short time.

Circuit interruption is caused by heating to 4,000° F. a narrow section in the copper bar through which the electricity is flowing. The copper vapor condenses almost instantaneously to the solid state on the relatively cool inside surface of the copper container. This action makes possible the total enclosure of the device to eliminate noise. The outside of the container never exceeds a temperature of 150° F. Heat of the flowing electricity releases a blast of gas from a piece of fibrous material surrounding the bar. The gas quickly blows out the electric arc between the melted ends of the bar, extinguishing the flow of electricity.

The limiter makes possible a new sabotage-proof method of distributing high-voltage power. It protects double-circuit cables against serious damage from a short circuit, which might be caused by worn insulation, water seeping into a cable, or by a wrench falling across bore conductors. Once blown, the inexpensive limiter can be replaced by a new one. Westinghouse Electric & Mfg. Co.

Photoelectric control for air-raid warnings which, from an inside location, views a street lamp and sounds an alarm when light is turned off. Operates independently of momentary flickering and ambient light conditions. Photoswitch, Inc.

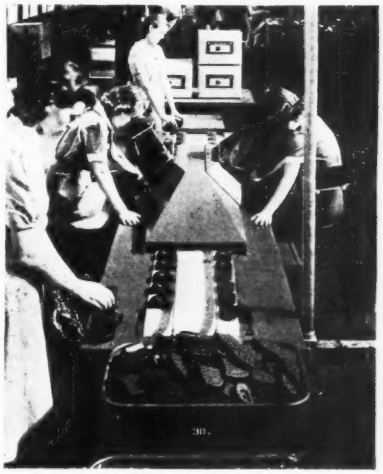
Camera for Employe Identification Badges

A COMPACT camera unit for employe badge photographs, reportedly capable of photographing 250 persons an hour, has an arm extending in front of the camera which automatically holds the subject in focus and displays interchangeable numbers. Standard sixteen exposure film is used, and, according to the manufacturer, no photographic skill is required to operate the unit. The equipment, which includes a camera, two photo floodlights, and a number container, is supplied in a metal storage cabinet and requires a floor space of 15 feet by 15 feet for operation. The outfit is available, without priority, for immediate delivery. Charles Mayer Studios.

Compact Camera Unit

Fork and Platform Trucks

GAS-POWERED vehicles for handling materials, parts, and finished products are now available with full electric equipment for storage battery power, where electric operation seems best fitted to the work. The machines lift from 2,000 to 7,000 pounds, using an hydraulic vane-type pump driven by a special series wound motor. The same pump operates the tilting unit, which enables the operator to tilt the load back 10 degrees in five seconds for safe riding, and forward three degrees in one second for tiering. There are four speeds forward and four in reverse; under full load the maximum speed is six miles per hour. The drive is on the front wheels, with rear wheel steer. The drive axle is of a special double reduction gear and pinion type mounted on ball and roller bearings. The drive motor is mounted directly to the axle and drives through ring gear and pinion. Standard equipment includes hydraulic brakes and spring mounted, rubber cushioned seats. Clark Tructractor Division of Clark Equipment Co.



Misplaced and Defective Washers in Rubber Heels Are Detected by an X-Ray Machine in a B. F. Goodrich Factory. Girls Remove Any Faulty Heels

Climbs 7½% Grade Under Maximum Load

UNITED STATES

Congress Passes Farm Rubber Bill; More Rubber to Come from Latin America

On July 22 the Senate passed a bill to create a separate agency to control the making of synthetic rubber from alcohol drawn from farm products, and the House the next day passed the Fulmer Bill, a duplicate of the Senate's Gillette Bill. (See below.) But it is believed the Gillette-Fulmer Bill may be vetoed by the President. Congress, however, is reported planning to override that veto.

Congressional investigation of the rubber situation continued last month. (See below.) Standard Oil revealed a new synthetic Butyl rubber, Flexon (see page 476) and an improvement in the regular Butyl rubber process to double the output at practically no increase in the use of untried materials of construction. (See page 487.) The RMA presented a plan to supply civilian passenger-car tires. (See page 482.) A new butylene-glycol-butadiene process from grain also was announced. (See page 476.)

Annual savings of many hundreds of tons of rubber are expected under revised specifications for rubber goods. Amendment No. 7 (see pages 479, 484) to Supplementary Order No. M-15-b-1 sets new specifications for airplane tires; while Amendment 8 (see pages 479, 485) relates to insulated wire and cable. Amendments 9 and 10 (see page 479) cover a long list of industrial goods and footwear, respectively. Amendment No. 1 to Conservation Order No. M-174 (see pages 479, 484) allows use of some elastic fabric unsuitable for health articles; but Amendment No. 4 to Conservation Order No. M-124 imposes further restrictions on the use of rubber yarn and elastic thread.

More rubber is forthcoming from Latin America. The United States has signed agreements with three additional countries for the cultivation and purchase of rubber. (See page 483.) Besides the United Fruit Co. has revealed it will grow rubber in the "banana republics." (See page 483.)

Prices on scrap rubber have been further revised. (See page 504.)

It was also rumored, but nothing official was reported, that President Roosevelt had asked Chief Justice Harlan Stone to head an independent inquiry of the rubber situation. It seems, though, that the Chief Justice declined. Any official confirmation of any part of the story is lacking although it has appeared in the press. A feeler, perhaps?

Congress Passes Gillette-Fulmer Bill

S. 2600 (the Gillette Bill) providing for the creation of a "rubber supply agency" was passed in the Senate with no dissenting vote July 22 despite administration opposition. Farm state members of Congress then correctly predicted its "certain" passage in the House, where debate on the measure was scheduled to begin July 23, although there were intimations of a presidential veto because the bill would take from the WPB its authority over the production of synthetic rubber made from alcohol derived from agricultural products and create an independent agency to control this part of the program.

On July 23 the House passed the Fulmer Bill, essentially the same as the Gillette Bill, by a vote of 104 to 18. The measure has been sent to the President. Highlights of the Gillette-Fulmer Bill follow: It will take from the WPB control of the manufacture of synthetic rubber made from alcohol drawn from farm and forest products and create a new agency to have full charge of such production. Director of this agency shall have "no other vocation or employment." Upon certification of this director the WPB must provide for the delivery of critical materials for plants and facilities for the synthetic rubber, and these materials have priority over all deliveries "for private account." No one concern shall control production of more than 10% of the total farm-products synthetic rubber business.

It was revealed by Committee members that Leon Henderson, OPA administrator, in a closed hearing had testified to the need of a rubber from grains industry. He was said to have urged the greatest possible production of rubber from any source.

Senate action had been delayed on the bill to await testimony of Donald M. Nelson, WPB chief. Mr. Nelson, testifying July 6, opposed the bill because, he said, it would permit unlimited expansion of plants for synthetic rubber production requiring critical materials that cannot be wasted in over-production, but he stated that if the synthetic program had to be formulated all over again he would provide 60% production from grains and 40% from petroleum. He declared that at present only the Carbide & Chemicals Corp. process of butadiene conversion from alcohol was proven.

An announcement was made July 17 that Mr. Nelson had assumed personal direction of the government rubber program. It was emphasized that he had not displaced Arthur B. Newhall, rubber coordinator.

Madigan Forecasts 1943 Synthetic Production

It was reported that M. J. Madigan, a special assistant to the Secretary of War in charge of war plant construction, in a closed session of the Gillette Committee investigation had expressed the opinion that 320,000 tons of butadiene would be in production by August, 1943. Mr. Nelson had said in testimony before the same committee the previous day that only 73,000 tons of butadiene will be in production by June 30, 1943. Mr. Madigan told the Committee three synthetic rubber plants of 30,000 tons' capacity each would be in production May 1, June 1, and July 1; four 20,000-ton plants on January 1, February 1, March 1, and April 1; one 15,000-ton plant on May 1; and one 5,000-ton plant on January 1.

Newhall Opposed Bill

Mr. Newhall told the Committee that styrene and butadiene plants in the synthetic rubber program will require 400,000 tons of critical material, including 165,000 horsepower of compressors. Testifying again on July 14, he accepted full responsibility for the prosecution of the synthetic rubber program to date and repeated his objection to the bill under discussion.

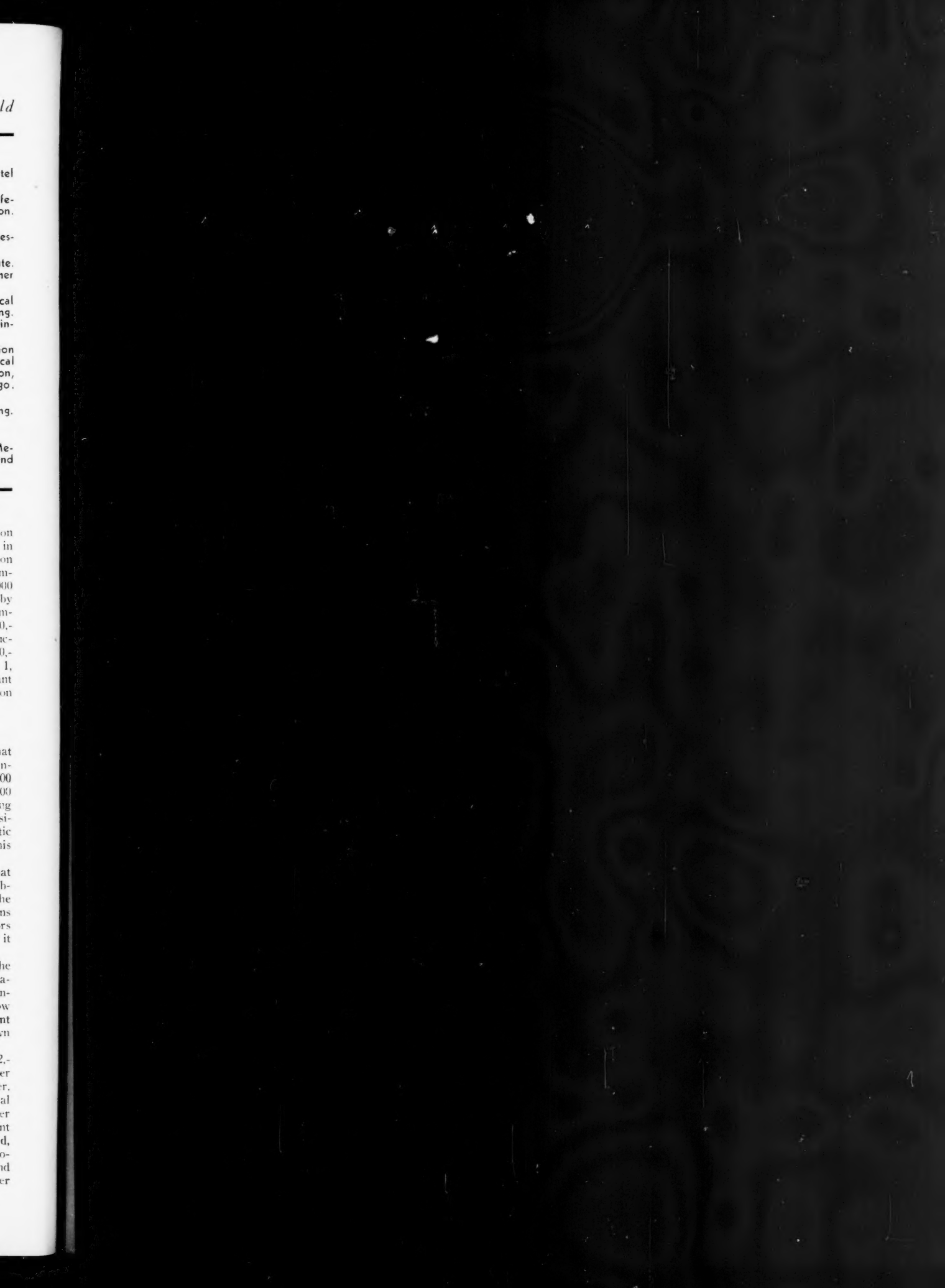
"The bill," he stated, "by requiring that production of all additional synthetic rubber be from agricultural products as the basic raw materials, would freeze decisions involving complicated technical factors when progress of the art may later show it to be now only in its initial stages."

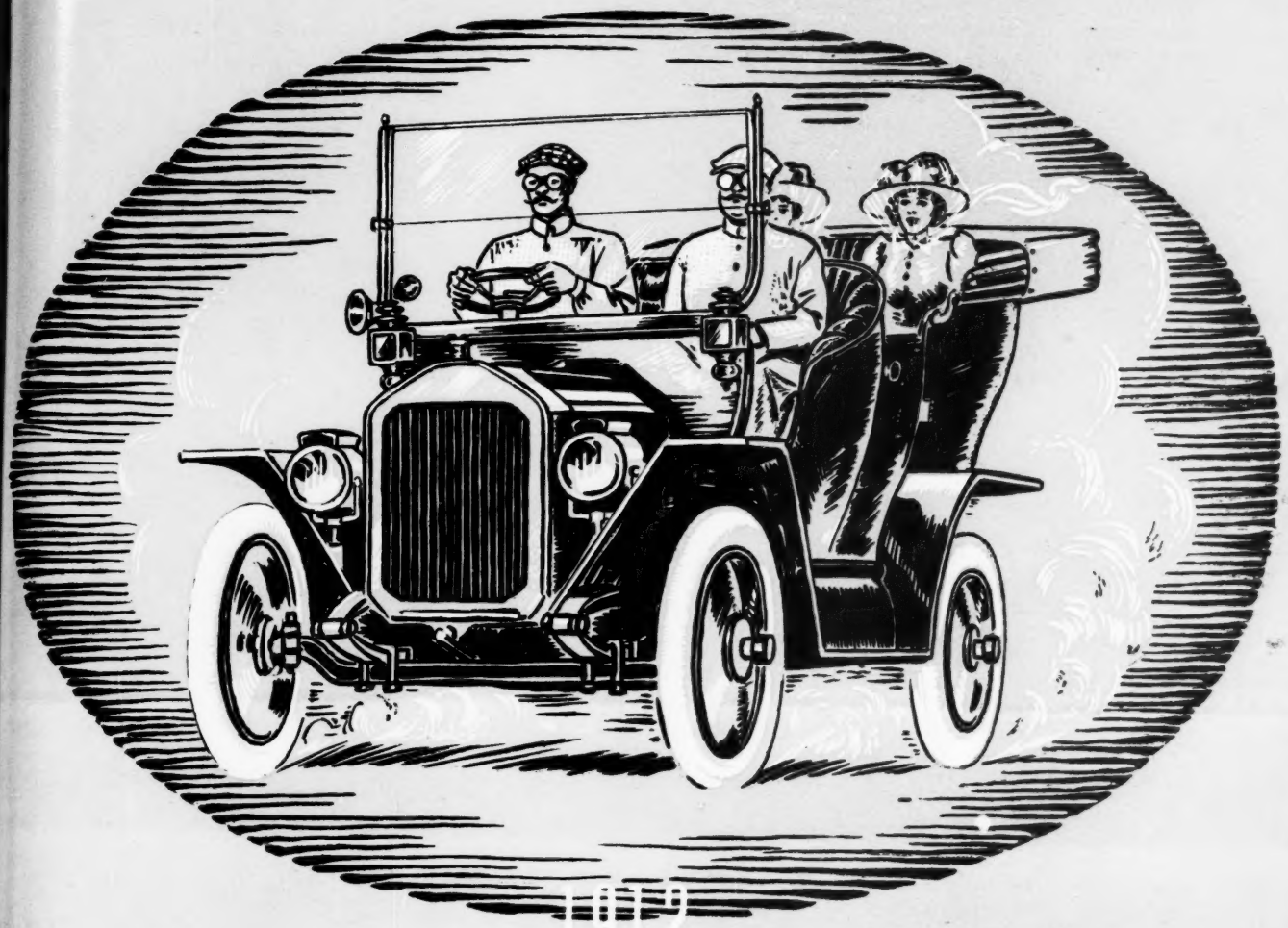
Further opposition was voiced on the grounds that the bill would impose legislative obligation to supply rubber for non-essential civilian needs which cannot now be afforded. He summarized the present status of the synthetic program as shown in the table on the next page.

The 800,000-ton program calls for 122,000 tons of steel plate, 210,000 tons of other steel, and more than 7,000 tons of copper, bronze, and brass. One of the most critical shortages affecting the synthetic rubber program is air compressors. The present program, the Rubber Coordinator stated, requires 37% of the total compressor production for the last quarter of 1942 and 22% of the production for the first quarter

CALENDAR

Sept. 10-11.	A. C. S. Rubber Division. Hotel Lafayette, Buffalo, N. Y.
Oct. 5-9.	N.S.C. Thirty-first National Safety Congress and Exposition. Stevens Hotel, Chicago, Ill.
Oct. 12-14.	A.S.M.E. Fall Meeting. Rochester, N. Y.
Nov. 9-13.	American Petroleum Institute. Annual Meeting. Palmer House, Chicago.
Nov. 16-18.	American Institute of Chemical Engineers. Annual Meeting. Netherlands Plaza Hotel, Cincinnati, O.
Nov. 24-29.	National Chemical Exposition and National Industrial Chemical Conference. Chicago Section, A. C. S., Sherman Hotel Chicago.
Nov. 30-Dec. 4	A.S.M.E. Annual Meeting. New York.
Nov. 30-Dec. 5.	Exposition of Power and Mechanical Engineering. Grand Central Palace, New York.

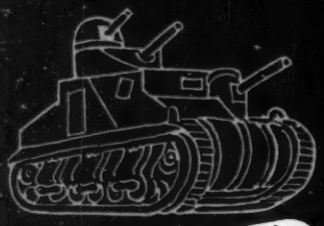




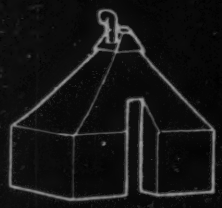
1912

Thirty years ago...

In the summer of 1912, when 3,000 was good tire mileage, when twenty-five miles per hour was fast driving, and dust and dusters ruled the road, important rubber history was written. It was then that the first practical application of carbon black was made in the reinforcing of rubber tires. It was then that Binney & Smith Company was called upon to undertake the furnishing of the pioneer black in the rubber industry, and it was that black which has since become world-renowned as — MICRONEX.



AND THIRTY YEARS *Later...*



1942

WHEREVER the Army rolls, flies, marches or bivouacs, there you will find many of the Columbian Carbon—Binney & Smith products.

Present production is almost entirely for war uses with a very minor portion for essential civilian needs. The results of our sixty years of research and experience now are being applied to helping in the greatest task ever undertaken by the Nation.

● **MICRONEX,** improved through the years to a high state of perfection, is giving its greatest service in the manufacture of tires for all military purposes. Micronex also is contributing to the quality of insulated wire, mechanical specialties and footwear.

● **FURNEX,** the pioneer semi-reinforcing carbon black, is helping to extend the dwindling natural rubber stock pile.

● **STATEX,** a specialty black, serves in the manufacture of electrical conducting compounds limited to war work.

In addition research is progressing in cooperation with the Army and Navy on confidential projects involving the use of carbon black in rubber.

● **MAGNETIC PIGMENTS** (pure oxides of iron) form a large proportion of the pigment content of the O. D. Lustreless Enamel so widely used on planes, tanks, guns, trucks and helmets. Also special coatings for tents and other fabrics.

● **BONE BLACKS** are finding wide application in protective coatings for military textiles such as fire-resistant tent cloths.

The new problems in relation to the processing of synthetic rubber have been under investigation by our Technical Department for some time in cooperation with the Rubber Industry. Carbon black is positively essential for the reinforcement of synthetics which lack tensile strength, elasticity and other properties inherent in natural rubber. Both channel and furnace blacks have important implications in this respect.

Possessing an experience of sixty years in carbon black, we are happy to cooperate fully with the Rubber Industry in solving one of the greatest problems that confronts the Nation.

COLUMBIAN COLLOIDS

BINNEY & SMITH CO. • COLUMBIAN CARBON CO.

DISTRIBUTOR MANUFACTURER


CARBON
NY
CO.

ESTIMATES OF RUBBER PRODUCTION
(Long Tons)

	1942			1943		
	Actual 1st Half	Objective 2nd Half	Total	1st Half	2nd Half	Total
Buna S	1,000	7,000	8,000	54,600	226,400	281,000
Butyl	—	300	300	1,700	19,300	21,000
Neoprene	3,600	8,400	12,000	9,500	11,500	21,000
Buna N & "Thiokol"	4,800	7,200	12,000	7,500	7,500	15,000
TOTALS	9,400	22,900	32,300	73,300	264,700	338,000

of 1943. Although many expansion programs for war materials have been substantially cut, the synthetic program has been left unchanged.

In a statement issued July 17 Mr. Nelson said that the present program of 800,000 tons annually is sufficient, but that the WPB has not closed its eyes to new developments. Thirty per cent of the butadiene in that program is being made from alcohol, and most of the remainder from petroleum. He added that a new and better method for making rubber from petroleum has been discovered, and as a result, the amount of strategic material is nearly on an equal basis for rubber from alcohol and petroleum sources.

Publicker Alcohol Process Investigated

The Gillette Committee visited on July 10 the Publicker Commercial Alcohol Co., Philadelphia, Pa., which is seeking government priorities to manufacture butadiene from alcohol for synthetic rubber. The process, invented by Waclaw Szuklewicz, a Polish chemist, who is said to carry the formula in his mind and to be the only one who knows it, is reported to use as a catalyst a tube 10 feet high containing a chemical. About 6½ pounds of synthetic rubber are produced by the process in the laboratory daily. The Committee was told that as many as 8,000 tubes could be set up, multiplying production by that number.

Several days later Charles M. Weis, a chemical engineer of New York, N. Y., reported to the committee that the process they saw was "no gold-from-seaweed proposition." His investigation showed, he said, that the process did produce butadiene from 100% ethyl alcohol in a single step with a yield of about 2.2 pounds of butadiene from a gallon of alcohol. He was convinced, he declared, that the process was capable of expansion to full-scale operation and that he saw no unusual difficulties in transforming the process from the laboratory to commercial production.

Houdry Process Explained

Also testifying before the Gillette committee were Eugene Houdry, inventor of the Houdry process for making butadiene from butane or butylene derived from petroleum, and Clarence H. Thayer, chief engineer of the Sun Oil Company and engineering consultant of the Houdry Process Corporation. Mr. Houdry on July 8 inferentially accused the Rubber Reserve Company of giving small consideration to the process, which is an adaptation of his process for cracking oil to produce aviation gasoline. He stated that by his method, which requires only two operations, the ingredient for synthetic rubber could be produced at a cost of from 7 to 7½¢ a pound, compared with 10 to 15¢ a pound by other processes. His cost figure was said to provide for plant amortization in five years. Fifteen Houdry process plants capable of producing 750,000 tons of butadiene necessary to manufacture 1,000,000,000 tons of synthetic rubber could be built with one-half to one-third the steel required in the plant construction for any other petroleum process, thus saving from 90,000 to 135,000 tons of steel, he contended. Houdry plants could be built in nine months, substantially the time required to build a plant for conversion of alcohol to butadiene and four months quicker than plants required for other petroleum processes.

Mr. Thayer on July 13 told the Committee that it is possible to obtain higher yields of butadiene at lower temperatures than by any other method using petroleum. Higher yields, the engineer explained, require a smaller amount of stock to produce a given quantity of product as compared to other processes.

"In the gasoline cracking process," he said, "the heat developed by burning the deposit off the catalyst during the regeneration step is greater than the amount required to perform the cracking reaction, and thus the extreme heat must be removed from the catalyst by means of tubes containing a circulating cooling media. In the Houdry butadiene process the pressure conditions are adjusted so as to balance the heat requirements for reaction with the heat produced by the regeneration step. The simplicity of this operation is exclusive with the Houdry butadiene process.

"The process which has been ordered by Rubber Reserve Co. to be put in general use for the petroleum rubber program supplies the heat required for the reaction by means of very large quantities of steam which is heated to a temperature of 1,400° F. and which is mixed with the feed stock."

The cost of Houdry plants was estimated at $12,000,000 each by Mr. Houdry.

"A recent government announcement called for an expenditure of $700,000,000 for the building of plants to produce 1,000,000 tons of synthetic rubber," he said. "If the Houdry process is adopted, the cost would be not more than $250,000,000. Of this sum, $180,000,000 would be required for the construction of the Houdry butadiene plants. The balance of $70,000,000 would be used for the building of styrene plants and other mechanical stages necessary to produce the rubber."

He further declared that the process had advanced through all technical stages, including engineering, necessary to immediate placing of orders for materials and starting of construction. Testing has been done in a pilot plant producing 40 tons a day.

Replying to statements that the reason the Houdry process has not been approved by the government is because basic changes were made in the past few weeks the inventor said, "There has been no change in the principle of the process since it was first submitted to the government agencies last April."

Increase of *Castilla* Production Expected

Earl N. Bressman, director, Agricultural Division, Office of the Co-Ordinator of Inter-American Affairs in a statement June 5 before the Senate committee investigating alcohol and synthetic rubber described the efforts of the Board of Economic Warfare to obtain a maximum production of Latin American rubber. He said that some 40,000 rubber tappers are now at work in the Amazon basin and that officials hoped to get another 20,000 equipped with tapping cups, machetes, medicinals, and other necessary adjuncts this year. Announcement was made of a new method of tapping, collecting, and preparing the latex and packing the rubber obtained from *Castilla* trees. Dr. Bressman estimated that effective organization of the labor supply, equipment, transportation, food, sanitation, and housing would produce annually 50,000 tons of rubber from *Hevea* in the Amazon basin, 30,000 tons from *Castilla* in northern South America, and 10,000 tons of Mexican guayule.

The success of the long-range rubber developmental program in South America, Dr. Bressman pointed out, would contribute materially toward conservation of United States petroleum resources and the soil of fertile grain lands, both of which could be greatly depleted by heavy demands of oil and grain alcohol for synthetic rubber. Although eventual plantation rubber costs in Latin America are still largely a matter of estimate, higher average yields, lower taxes, shorter freight hauls, and cheaper supervision might offset higher labor costs and enable competition with Far Eastern plantation production, if and when resumed. Government ownership of any rubber facilities to be established in the near future was suggested as one way of preventing the building up of commercial groups with vested interests in some one form of rubber production. Such federal control would permit the nation to exercise a free choice in the future that most effectively serve the country's interests.

Jones Denies Discrimination

In testimony before the Senate Banking and Currency Committee on July 15, Jesse Jones, Secretary of Commerce, declared that enough rubber will be produced this year and in 1943 to supply the essential needs of the armed forces and the country's war workers. He said that the information at hand indicated that synthetic rubber production capacity would be 100,000 tons at the end of 1942; 300,000 tons at the end of August, 1943; and 800,000 tons at the end of 1943. Although the existing crude stocks and the 800,000-ton synthetic program may be supplemented by Flexon, a recent development of the Standard Oil Co. (N. J.), and "Thiokol", he strongly urged that no one use a car except for absolutely necessary transportation. In response to charges that the government had sidestepped the possibility of making synthetic rubber from grain, Mr. Jones declared that there had been no discrimina-

tion against any person, process, or corporation in the development of the national rubber program.

Farish Announces Rubber Substitute

On the same day W. S. Farish, president of the Standard Oil Co. of New Jersey, appeared before a subcommittee (investigating production of rubber and other materials from coal) of the House Committee on Mines and Mining and described two recently developed processes that may augment the government's scheduled synthetic rubber production by 200,000 tons before the end of 1943. During the next 18 months the additional rubber could supply 34,000,000 tires. One method explained by Mr. Farish contemplates the production of Flexon, a recently developed rubber substitute of the Butyl type, manufactured by makeshift equipment and using dry-ice as a refrigerant.

"Flexon," Mr. Farish said, "is still sometimes pretty bad, but everyone seems to be optimistic in the belief that it will be useful as a rubber substitute—that even for tires it ought to make a very much better tire than reclaimed rubber."

The material will be made by several companies in various parts of the nation, wherever isobutylene and dry ice can be obtained in sufficient amounts, if its development is approved as an emergency measure.

Concerning the second method of producing additional rubber, Mr. Farish said that Standard Oil will be able to make between 15,000 and 30,000 tons of butadiene in makeshift plants using spare equipment and odds and ends of junk to patch up temporary facilities, thus relieving the butadiene shortage which has been conceded to be one of the grave bottlenecks of synthetic rubber production. The operations in these plants will be inefficient, and the butadiene will cost more than that made in properly designed new plants, but it will permit the production for buna rubber of a considerable amount in advance of the government program.

He also revealed that recent tests covering thousands of miles at speeds of 55 miles an hour showed that Butyl tires are now good for at least 60% of the mileage of natural rubber. While Butyl rubber tubes are still unable to stand the abuse that natural rubber will take from overloading and underinflation, they will outlast the casing under these conditions. Per K. Frolich, head of the Esso Laboratories, told the committee that Butyl tires could be "nursed" for 16,000 miles.

Discussing synthetic rubber costs, Mr. Farish stated that buna rubber at first will cost 30¢ a pound when made from butadiene derived from petroleum. When plants are running at maximum efficiency, the cost will be reduced to 20¢ a pound or less. The first Butyl rubber will cost about 20¢ a pound, but the price may eventually be reduced to between 10¢ and 15¢ a pound. Buna rubber plants, originally estimated to cost $1,000 a ton of annual capacity, are now figured to cost about $600. Butyl plants, first estimated to cost as high as $750 a ton, are now expected to cost about $350 a ton of annual capacity.

Arthur B. Newhall, rubber coordinator, had reported July 5 that the rubber program probably would not require all the $050,000,000 which Congress has authorized for it as a result of substitution of cheaper and more plentiful materials for steel plates, other steel, copper, and other scarce materials.

Styrene and Alcohol Available

Although rigid controls will likely continue in effect for styrene and its raw material, benzol, for an indefinite period, supplies of both, the chemical industry believes, will prove sufficient for synthetic rubber production this year and next. Dow Chemical Co. and Monsanto Chemical Co., reportedly, will begin production of styrene soon.

Fraser M. Moffat, Jr., recently resigned chief of the Alcohol and Solvents Section of the WPB, said on July 15 that that agency had offered to divert 200,000,000 gallons of alcohol to the Rubber Reserve Co. during 1943 for making butadiene. The rubber agency reported that actual consumption next year would be between 110,000,000 and 125,000,000 gallons. Conversion of the beverage industry is expected to be completed late this autumn.

Ellender Bill Awaits Senate Action

The final hearings on S. 2560 (the Ellender bill) providing for tires for 20,000,000 civilian cars during the war emergency were concluded before the Senate Banking and Currency Committee in July. Many firms working on war orders have reported their workers to be dependent on private car transportation which the bill seeks to maintain. At a press conference, Mr. Newhall said that 6,000,000 tires had been reclaimed since January 1 and that enough recapping material had been currently allocated to reclaim 750,000 additional tires.

Jesse Jones, Secretary of Commerce, told the Committee he would have no objection to the bill if it was amended to give the President authority to decide whether the amount of reclaim and crude provided for in the bill might be allocated. If enacted as the bill now stands, the allocation is lawfully mandatory. The bill awaits a quorum of the Committee to vote it out or to reject it. Most of the committee members were reported out of town, but a pool of the committees has indicated a majority for it. However it is believed in some quarters that the bill may be amended before Senate debate begins.

Senator Ellender in a recent release stated that the tire retread program of the tire manufacturers indicates industry endorsement of his measure.

Another House Committee Investigates Rubber

An unofficial bi-partisan House committee of 10 members, created at the suggestion of Representative Hartley, (N. J.), was organized to study synthetic rubber, gasoline, and fuel oil. Hearings were scheduled to begin July 27.

Butylene Glycol Process

A new, cheaper commercial process for producing butadiene rubber from butylene glycol from grain was announced in July by E. Seagram & Sons, Inc., distiller. The process, it is said, requires less equipment than any previously known process for making synthetic rubber and produces a superior quality of butadiene. Butylene glycol is produced when a carbohydrate crop is fermented by a micro-organism called *Aerobacter Aerogenes*. It is believed that the butylene glycol is then converted into butadiene by the use of acetic acid. About eight pounds of rubber are obtained from a bushel of grain at a cost of about 20¢ a pound. Blueprints for a plant to produce 200 tons daily have been submitted to the WPB by the Seagram company. This process is thought to be similar to the butylene glycol process now under test by the government's Northern Research Laboratories at Peoria, Ill., which Mr. Nelson stated in testimony before a Senate subcommittee he was "particularly interested in" and had given "all the encouragement I can" to its development. Excellent yields of pure butadiene have been obtained from the butylene glycol on a laboratory scale by government chemists. The major remaining problem was the conversion of butylene glycol to butadiene on a commercial scale, and the Seagram company reports that this has been accomplished in a pilot plant.

Appointed Government Agents To Buy Scrap Rubber

Jesse Jones, Secretary of Commerce, on July 13 announced that Rubber Reserve Co., on June 18, contracted with A. Schulman, Inc., 790 E. Tallmadge Ave., Akron, O., H. Muehlstein & Co., 122 E. 42nd St., New York, N. Y., Nat E. Berzen, Inc., 551 Fifth Ave. New York, N. Y., and Loewenthal Co., 188 W. Randolph St., Chicago, Ill., to act as its agents in buying scrap rubber throughout the United States. As a result of these contracts, these companies are no longer in the scrap rubber business for their own account. They cannot buy, sell, or deal in scrap rubber except for the account of Rubber Reserve Co. All four companies agreed to render this service to Rubber Reserve without profit, but will be reimbursed for their actual costs and expense.

These companies ordinarily buy and sell approximately 80% of all the scrap rubber in the country. They have nationwide organizations and can handle all the scrap that will be bought by Rubber Reserve Co. Other scrap dealers may sell scrap rubber to Rubber Reserve Co. through any one of these four companies at $25 per ton, carload lots, f. o. b. point of shipment, and 6¢ a pound for tubes. Junk dealers who had on hand a small amount of beadless tires could sell them to Rubber Reserve at $31.50 per ton until July 15, and $3.50 per ton for the beads.

The four companies have bought for account of Rubber Reserve 103,400 tons of scrap rubber. They began buying scrap from other dealers for account of Rubber Reserve Co. immediately after announcement of the $25 per ton price, and these purchases are entirely independent of and in addition to the rubber gathered by the oil companies in the scrap rubber drive authorized by the President.

Department of Agriculture Doings

United States Department of Agriculture Washington, D. C., reports that at the Northern Regional Research Laboratory of the Bureau of Agricultural Chemistry and Engineering, Peoria, Ill., chemists working with such farm products as soybean oil and corn oil have produced materials that look, smell, and feel much like natural rubber. Some of these products will stretch 200% or more and return to their original forms, and they show tensile strengths of approximately 500 pounds per square inch. The general run of natural rubber has a 600% stretch and a tensile strength of 3,000 pounds or more. But a substitute that is only a fraction as strong and elastic is entitled to be called promising for some purposes, say Bureau chemists and engineers. There are other important qualities than stretch and tensile strength, i. e., resistance to abrasion, cracking, oxidation, heat, and the effects of light and chemicals. Most of the work so far has been only on a laboratory scale, but some of it is being tested in the pilot plant. If this proves satisfactory, the next step would be commercial trials.

Entomologists Study Guayule Insect Pests

Planning against possible insect attacks against United States grown guayule, Department of Agriculture entomologists are studying protection methods for this rubber-bearing plant. Twenty types of insects have been listed as potential enemies of guayule. A small bark beetle reportedly attacking stacked guayule in Mexico, which is able to breed in the dry shrub for more than a year, is regarded as the greatest threat to the stored material awaiting conversion to rubber. Prompt utilization after harvest is suggested to prevent beetle attacks in the cut material. Since these beetles are not known to be present in the United States, quarantine measures may prevent migration of such insects into this country.

Other insects which attack similar plants and may extend their attentions to guayule are root-damaging white grubs and dryland species of wireworms and millipeds; leaf-eating caterpillars, grasshoppers, and beetles; sap-sucking aphids; scale insects; maggots and caterpillars that thrive on pollen, nectar, and the inner parts of the flowering heads. They are all under close study by federal entomologists.

Inter-American Agriculture Conference

The Second Inter-American Conference on Agriculture was held this summer in Mexico City, Mexico. The first had been held in Washington, D. C., 12 years ago, but the third is planned two years hence. Representatives of the 21 American republics attended at Mexico City. The 75 delegates passed 76 resolutions without a minority report or a single dissenting vote.

The main purpose of the conference was to exchange scientific ideas and to develop cooperative research along technical and scientific lines. Many papers were presented, followed by discussion.

In a report of the Conference, Claude R. Wickard, United States Secretary of Agriculture, stressed the important position rubber held. We quote him:

"Rubber was just about as popular a subject at the conference as it is in the United States. . . . this country has been helping develop rubber production in the tropical areas of the Americas. We are taking part in the co-operative research—trying to find better varieties and cultural practices and more suitable areas for growing rubber.

"The chief aim, of course, is to get the largest and most efficient production possible. We are encountering many other problems along the way. There is the problem of getting people to go to the tropics, and caring for them after they get there. That involves housing, feeding, transportation, and medical care.

"Also, it is very natural that the rubber-growing countries want to have some assurances about markets after the rubber is produced. Again and again the delegates from those countries asked this question: Should they go ahead and develop production of natural rubber for the United States when we were planning a huge synthetic rubber program? They wondered if we would continue to produce synthetic rubber plants even though the cost of synthetic rubber was higher than tree rubber.

"Now that was the very kind of question *our* farmers would ask under similar circumstances. We could not, of course, give a flat answer to so complicated a question. But we did point out that the United States Government retained control of the synthetic plants with the feeling that they should not be operated behind a tariff wall that would mean high priced rubber for American consumers and at the same time would interfere with trade to our own good neighbors to the south of us."

E. W. Brandes, of the Department's Bureau of Plant Industry, who is in charge of plant research, in a Conference address reported encouraging progress in reestablishing commercial rubber production in the Western Hemisphere.[1] Dr. Brandes suggested, as the next logical step in the program, demonstration plantations that serve as a connecting link between the research activities and the small owner and cited one plantation of 2,000 acres, formerly in bananas, that is to be used as a demonstration planting near one of the research centers. Others also are planned. Dr. Brandes believes that demonstration plantations might be so planned and located as to center interest in undeveloped regions where the settlers could utilize family labor to harvest wild rubber while their young trees are maturing.

[1] See India Rubber World, June, 1942, pp. 239-43; July, pp. 350-56; Aug., pp. xxx-xx.

Intensified Scrap Collection Campaign

The American Industries Salvage Committee recently was formed, representing groups of leading industrial concerns working with the WPB Conservation Division to help speed the collection of vital scrap materials. Representing The Rubber Manufacturers Association, Inc., on the AISC's administrative committee is R. S. Wilson, vice president of The Goodyear Tire & Rubber Co., Akron, O.

Lessing J. Rosenwald, chief of the Bureau of Industrial Conservation, on July 20 formally inaugurated an intensified nation-wide salvage campaign to collect enough scrap, including rubber, to keep war effort production on a capacity basis. The official campaign will be assisted by the educational campaign under the direction of private industry.

Already organized volunteer efforts of two of the country's leading industries have been added to the salvage program. These are the Automotive Safety Foundation with its membership of rubber, automotive, and oil companies, and the Farm Equipment Institute and National Retail Farm Equipment Association, representing manufacturers and dealers of farm implements.

Also, in each state a representative from the oil, rubber, and motor industries was appointed to work with the State Salvage organization. Because of their size several states have more than one representative. Among the proposed state representatives of the Rubber Industry 1942 Salvage Campaign are: *Alabama*, J. E. King, district manager (Birmingham), Firestone Tire & Rubber Co.; *California*, F. E. Titus, assistant general sales manager, The B. F. Goodrich Co. of California, Los Angeles; and G. B. Swarthout, district manager, (San Francisco), Goodyear Tire & Rubber Co.; *Colorado*, C. C. Gates, president, Gates Rubber Co., Denver; *Connecticut*, F. Machlin, secretary-treasurer, Armstrong Rubber Co., West Haven; *District of Columbia*, Dan Kimball, The General Tire & Rubber Co.; *Georgia*, W. C. Harris, district manager (Atlanta), Firestone; *Illinois*, A. C. Kelly, district manager (Chicago), The B. F. Goodrich Co.; *Indiana*, L. E. Randle, district manager (Indianapolis), Firestone; *Iowa*, S. W. Lowry, president, Lake Shore Tire & Rubber Co., Des Moines; *Kansas*, J. F. Ward, district manager (Kansas City), Firestone; *Louisiana*, J. S. Mosher, district manager (New Orleans), Goodrich; *Maryland*, E. S. Burke, president, Kelly-Springfield Tire Co., Cumberland; *Massachusetts*, L. L. Black, district manager (Boston), Goodrich; *Michigan*, R. C. Murphy, vice president, Corduroy Rubber Co., Grand Rapids; *Minnesota*, J. L. Bain, district manager (Minneapolis), Firestone; *Missouri*, L. L. Sowers, Goodrich; *Nebraska*, J. E. Yonts, district manager (Omaha), Firestone; *New Jersey*, W. F. Regan, district manager, United States Rubber Co.; *New York*, E. B. Germain, president, Dunlop Tire & Rubber Corp., Buffalo; J. Chester Ray, U. S. Rubber, New York, and F. G. Harrison, district manager (Albany), Goodrich; *North Carolina*, R. E. Noble, district manager (Charlotte), Goodrich;

North Dakota, P. V. Roovaart, district manager (Fargo), Goodyear; *Ohio*, J. P. Seiberling, Seiberling Rubber Co., Akron; *Oklahoma*, A. W. Spickard, district manager (Oklahoma City), Firestone; *Oregon*, C. W. Thorp, district manager (Portland), Goodyear; *Pennsylvania*, George H. Duck, Lee Rubber & Tire Corp., Conshohocken, and H. W. Jordan, president, Pennsylvania Rubber Co., Jeannette; *Tennessee*, P. L. Moore, Firestone Tire & Rubber Co., Memphis; *Texas*, W. O. Boone, district manager (Dallas), U. S. Rubber, and P. E. Slack, district manager (Houston), Goodrich; *Utah*, G. G. Sims, district manager (Salt Lake City), Firestone; *Virginia*, C. A. Plumlee, district manager (Richmond), Goodyear; *Washington*, P. W. Pym, district manager (Seattle), Firestone; *Wisconsin*, J. N. Lees, district manager (Milwaukee), Goodyear. The other state representatives are tire dealers.

Army Conservation Measures

Recently announced rubber conservation measures of the Army include the redesigning of earth-moving equipment tire treads. There is from 16 to 32% less rubber in the new treads, depending upon tire size. By replacing aluminum bridge pontoons with deflatable rubber ones, the War Department will effect a savings of 30,000 pounds of rubber for each bridge unit through reduced transportation requirements. To transport an aluminum unit 72 trucks with semi-trailers are necessary, and the rubber for tires for these trucks amounts to 95,000 pounds. The rubberized fabric pontoons for one unit, when deflated, can be packed in 36 trucks. The amount of rubber used in the pontoons, added to that required for the truck tires, amounts to only 65,000 pounds.

Synthetic Tire Tests

Comprehensive tests under realistic conditions will be applied to synthetic rubber tires ordered in large quantities, the War Department announced June 25. The tires, equipped with treads for use in mud and snow, will be shipped as rapidly as practicable to troops and will be applied to vehicles that run the greatest mileage and undergo the most severe service. But they will not be placed on vehicles shipped from the continental United States. Only one type of tire will be applied to any one vehicle (except spare tires, which will be standard), but various makes will be applied to vehicles in comparable service to enable comparison in wear and performance. Mileage at which synthetic tires are applied will be recorded and kept so that subsequent inspections can be made and tires gaged for wear. Troops will report blowouts (except those caused by natural hazards), tread separation, and excessive tread cuts. Civilian tire inspectors will report heat breaks, tread or ply separation, excessive cutting, tread or sidewall cracks or sun checking, rapid tread wear, and any unusual conditions not occurring in standard production tires. As necessary, synthetic tires will be recapped or retreaded.

Additional Export Rulings

Board of Economic Warfare, Office of Exports, Washington, D. C., on June 23 issued Current Control Bulletin No. 29 listing shipping ratings for articles and materials moving under general license to other American republics. *B* ratings have been assigned to cotton tire cord on cones or warps, unbleached cord and other unbleached tire fabrics, and surgical, sanitary, and hospital supplies. A C rating is listed for corsets, brassieres, and girdles.

Current Controls Bulletin No. 31, issued June 30, amended, effective July 1, general license provisions regarding the $25 general license and special provisions for chemicals, medicinals, and pharmaceuticals. Articles and materials may be exported under general license to group K destinations where, in a single shipment, the net value of such articles and materials classified under the same Schedule B or F number does not exceed $25, but this provision does not apply to many items, including: acetic acid; antimony, metal, salts, and compounds; beta naphthol, butadiene, including polymers and copolymers of; carbon tetrachloride; cashew nut shell oil;[1] chloroprene, including polymers and copolymers of; cotton duck cloth; dibutyl phthalate; dimethylaniline; diphenylamine; electric indicating, measuring, and recording instruments; formaldehyde; gages, precision; gas masks; glycerine; industrial indicating, recording, or controlling instruments and apparatus; naphthalene; oiticica oil; palm oil; perilla seed and oil; phthalic anhydride and phthalates;[1] polyvinyl chloride;[1] rapeseed oil; rubber; synthetic, unfabricated rubber-like compounds, including polymers and copolymers of butadiene, butylene, styrene, vinylidene chloride, and acrylonitrile; styrene; titanium, metal, salts, and compounds; toluol; and zinc, metal (except finished articles), salts, and compounds.

[1] All forms, conversions, and derivatives included.

New Conservation Unit

Sheldon P. Thacher, formerly manager of the United States Rubber Co.'s field engineering and service department and more recently director of rubber conservation, Motor Transport Service, Office of the Quartermaster General, last month was made chief of the Rubber Conservation Section, Army and Navy Munitions Board. In its order establishing a Rubber Conservation Section to deal with all phases of rubber conservation in the armed forces of the United States, the Board's executive committee indicated that Mr. Thacher's functions will be to organize, coordinate, and direct all rubber and rubber products conservation activities with respect to natural, synthetic, and reclaimed rubber throughout the armed services—land, sea, and air.

The order also directs the Rubber Conservation Section to maintain liaison with industry, the War Production Board, Rubber Reserve Co., Office of Defense Transportation, Office of Petroleum Coordinator, and the Office of Price Adminstration on matters pertaining to rubber and particularly relating to its conservation and usage restrictions.

Chemicals for Rubber

(Continued from page 470)

dip and will not affect the future working of the rubber. A similar dispersion can be used as a lubricant in cutting gaskets.

Ammonium Stearate Paste S (sp. gr. 0.96 at 25°/25° C.) incorporated into rubber cements is reported to increase coverage and to give smoother compounds. In a raw rubber mix amounts up to 4% increases the adhesion of rubber to cloth on vulcanization. It is a pearly white soft paste dispersible in water and completely soluble in alcohol. It forms an emulsion with oils and hydrocarbons.

Hevealac, a finish for rubber, synthetics, and fabrics requiring high elasticity, is a resin solution (in alcohol) which dries rapidly to give a high gloss. The bright, clear coating is reportedly non-inflammable, for practical purposes, when dry. It is unaffected by water, oils, and most hydrocarbons. Hevealac strongly adheres to most surfaces and is said to retain flexibility at low temperatures.

Foamapin Liquid, produced from freely available natural domestic raw materials, has been developed to replace Saponin as a strong and durable foaming agent. It is reportedly compatible with latex. The addition of small percentages of wetting agents is said to give increased surface tension reducing properties, and a foam superior to most grades of Saponin. It is soluble in water in all proportions. Such solutions are stable, and there is no decomposition on evaporation of the water.

Plasticizer for Synthetics

TARZAC is a plasticizer for synthetic rubbers, particularly of the Perbunan type. It is oil-like in consistency and reportedly mills readily into the rubber. Use in Channel Black S, Thermax S, and Kalvan S is claimed to result in the quick incorporation of both plasticizer and loading material in the compound. Used directly or with the S pigments, Tarzac is said to produce stocks that calender and extrude smoothly and rapidly. It is available in 55-gallon drums from R. T. Vanderbilt Co., Inc., New York, N. Y.

Popular Accelerators Added

TWO of the most widely used accelerators, mercaptobenzothiazole and benzothiazyldisulphide have been added to the lines sold by Naugatuck Chemical Division of United States Rubber Co. and Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., and of the Monsanto Chemical Co. The first two companies will sell the accelerators under the coding of MBT and MBTS, respectively and the Monsanto designation will be Thiotax and Thiofide. The United States patents covering the manufacture and sale of these materials expired on July 7. These accelerators have been available for several years and will continue to be available from R. T. Vanderbilt Co., Inc., under the trade names of Captax and Altax.

More Rubber Savings Indicated; Other WPB Restrictions and News

Amendment No. 7 (see page 484) to Supplementary Order No. M-15-b-1, effective July 1, gives new specifications for making airplane tires which are expected to save 750 tons of crude rubber a year. Approval of the measure came from the WPB aircraft and rubber branches, the Navy Bureau of Aeronautics, the Material Center of the Army Air Force, and the Aeronautical Board of the Army and Navy.

Amendment No. 8, issued July 10, (see page 485), revised specifications governing the use of rubber in insulated wire and cable and made them applicable also to all military uses in order to save an additional 150 to 200 tons of crude rubber monthly. Specifications previously in effect were applicable only to insulated wire and cable for civilian uses. The new specifications are applicable to civilian orders, war orders, and all other orders placed by governmental agencies. An exception is made for certain types of wire and cable which require heavier than normal insulation, such as submarine cable, military field communication wire, and specially designed naval and aviation cable, and also in the case of war orders where the contracting officer certifies the use of different insulation is necessary for direct military or naval use. The specifications were approved by the Army, Navy, Munitions Board, and various WPB agencies after discussion with the industry.

At the same time the WPB Building Materials Branch warned that preference rating assistance cannot be granted for insulated wiring for any building not essential to the war effort because of the critical shortages of copper and other materials used in making the wire. Ratings for wire will not be granted for buildings which can be used without electricity, or for repair and maintenance of circuits or services not absolutely essential. Ratings for insulated wiring will be granted only for Army, Navy, Marine, and Maritime Commission purposes; for munitions plants; for war housing when certified by the WPB Housing Branch; for farm machinery in certain cases approved by the WPB and the Department of Agriculture; and for essential maintenance and repair purposes.

Further conservation of rubber by more stringent specifications for a long list of civilian products was decreed July 21. Amendment No. 9 to Order M-15-b-1 sets up revised specifications for belting, hose, packing, dam and lock gate seals, hog scraper (beater) paddles, loom pickers, milk and milking machine equipment, pipe coupling rings, press die pads, printing rubber products, rubber-lined tanks, drums, and rubber protected industrial equipment, abrasive implements, and mine and industry safety parts. Amendment No. 10 changes specifications for rubber footwear. The changes in Amendment No. 9 are expected to result in the saving of from 500 to 600 tons of crude rubber per month. An additional 100 tons a month are expected from the changed rubber footwear specifications, with the same number of pairs manufactured per year as in the past.

(Both these amendments will be published in full in our September issue.)

Amendment No. 1 (see page 484) to Conservation Order No. M-174, issued June 27, lifting restrictions on the use of some of the elastic fabric unsuitable for health articles, permits a manufacturer to use as he sees fit up to 10% of his stock of such elastic fabric, pending action on appeal to the WPB for authority to process some of the stock he had on hand June 20. The original order allowed the use, pending appeal, of 10% of such fabric, but restricted the amount of elastic fabric which could be used in any garment or finished product to not more than 15% of the amount used in corresponding articles in May, 1941. However, after the order was issued June 20, it was found that a number of manufacturers had not restyled their lines to operate within the 15% provision. As a result, some manufacturers were forced to close down. The amendment will relieve that situation.

J. B. McCullough, chief of the Webbing and Braiding Section, WPB, said that despite the removal of the 15% restrictions, manufacturers should put forth every effort to curtail the amount of elastic fabric used in any garment to make supplies last as long as possible.

The Defense Supplies Corp. is made the sole purchasing agent for the rubber yarn, latex yarn, and elastic thread frozen by Conservation Order M-124, under Amendment No. 4, announced July 21. At the same time the WPB amended Schedule "A" of Priorities Regulation No. 13, to prohibit all other sales of these materials.

Amendment No. 4 adds industrial goggles and webbing for artificial limbs to the list of essential health items in which the use of previously fabricated rubber thread of size 61 or finer is permitted. This list was formerly the same as Group 15 of List B of Order M-15-b, covering products for which crude rubber and latex may be used upon special authorization. The new amendment to M-124 adds two items to the list of products in which rubber yarn of the specified sizes may be used if it has already been made up. Restrictions on the use of rubber or latex for such yarn remain as before.

Under this amendment bare and covered rubber thread purchased by the DSC will be held for allocation by the WPB for use in military equipment and in specified health articles. Knitters and weavers having contracts for war materials or for essential items may purchase their supplies of rubber yarn or thread only from the DSC upon authorization by War Production Board.

The purpose of the amendment is to prevent deterioration of present supplies of rubber yarn and elastic thread and to facilitate production of materials permitted by the Order. Moreover knitters, weavers, and other users will be relieved of the burden of carrying such frozen material on their inventory. The amendment will enable DSC to concentrate all supplies of suitable yarn and thread in three warehouses. At present, stocks are scattered throughout the country in various size-lots. Some of the storage places are unsuitable for storing such perishable yarn or thread.

The list of products for which previously fabricated rubber yarn, covered latex yarn, or covered elastic thread of size 61 or finer may be used follows: industrial shoes, belting, and flexible metallic hose; webbing for respirators, hose masks, gas masks, and inhalators; repair cords and webs; webbing for artificial limbs; surgical stockings; industrial goggles; edging for baby pants; trusses (including umbilical belts); supports for abdomen, back, and breast, but only to the extent permitted under General Limitation Order L-90; sanitary belts and men's athletic supporters, but only to the extent permitted under General Limitation Order L-137.

(The amendments will appear in full next month.)

Rubber Coordinator Arthur B. Newhall called attention June 25 to the fact that the ban on destruction of rubber articles contained in Supplementary Order No. M-15-b includes the burning of old or cut-up tires for the purpose of preventing frost damage in citrus and other fruit orchards.

Tire Manufacturing Equipment Restricted

General Limitation Order L-143, issued July 4, prohibits all production and delivery of tire manufacturing machinery and equipment without specific authorization of the Director of Industry Operations and also imposes restrictions on reconditioning and rebuilding used tire machinery and equipment.

Manufacturers were allowed 15 days from the date of issuance of the order to complete current production. No further unauthorized production will be allowed, and delivery of raw materials or semi-fabricated or fabricated parts for incorporation in unauthorized new machinery was banned at the expiration of the 15-day period. A similar time period was allowed for completion of current unauthorized reconditioning and rebuilding operations.

Persons desiring to purchase tire machinery or equipment after expiration of the 15-day period are required to make application on Form PD-552 addressed to the War Production Board, Special Industrial Machinery Branch, and marked Ref: L-143. If authorization is granted by the Director of Industry Operations, it is to be presented to suppliers who then will be allowed to make deliveries. Such deliveries must be made out of existing stocks where possible. The same procedure is required for procurement of reconditioned or rebuilt machinery, regardless of whether the applicant is to undertake reconditioning himself or desires to secure permission for purchase of reconditioned equipment. Where possible, reconditioning is to be done with existing stocks of raw materials or parts.

Purchase of repair and maintenance parts for tire machinery and equipment will not be allowed except for repair of actual breakdowns where parts are not otherwise available, and for acquisition of inventories not in excess of minimum requirements for ordinary operations. Manufacturers are allowed to produce repair or maintenance parts in quantities not in excess of amounts required for a working inventory.

In issuing the order the Special Industrial Machinery Branch of the Division of

Industry Operations pointed out that the federal government is practically the sole customer for tires today, with all sales under strict allocation. Consequently steps had to be taken to avoid duplication of tire manufacturing facilities which generally are adequate in relation to the available supply of rubber. In addition the order will result in acquisition of exact records as to the whereabouts, condition, design, etc., of existing machinery, to make possible efficient allocation of authorized tire production among existing facilities.

The order requires complete records for not less than two years on production, deliveries, and orders for tire machinery and equipment, including copies of applications and authorizations on PD-552. Manufacturers and dealers were required to file on PD-553, within 15 days after issuance of the order, a record of unfilled orders as of the date of issuance of the order.

Machinery and equipment covered by the order are: tire building machines, tire and tube watch case vulcanizers, tire and tube pot heaters, tire and tube molds, tire and tube matrices, tire flat rings, tube mandrels, horizontal tire and tube vulcanizers, tire and tube mold steel backs, gooseneck bead presses, bead winders, tire building drums, and tire vacuum boxes.

Retreading and recapping equipment is not included, for it is subject to limitations of General Limitation Order L-61.

Amendment No. 1 to above Order L-143 issued July 21, extended until August 3, 1942, the last date allowed for building, repairing, and delivering tire manufacturing machinery and equipment, except under terms of the order.

New Appointments

Recently named was the Tire Industry Technical Advisory Committee, with C. S. Reynolds, chief of the technical section of the Rubber Branch, as government presiding officer. Committee members follow: H. E. Elden, Dunlop Tire & Rubber Co., Buffalo, N. Y.; W. W. Benner, Lee Rubber & Tire Corp., Conshohocken, Pa.; Luther Martin, United States Rubber Co., New York, N. Y.; Harry Soulen, Mansfield Tire & Rubber Co., Mansfield, O.; and T. G. Graham, B. F. Goodrich Co., C. J. Jahant, General Tire & Rubber Co., V. L. Smithers, V. L. Smithers Laboratories, T. E. Pittenger, Firestone Tire & Rubber Co., W. S. Wolfe, Goodyear Tire & Rubber Co., and H. P. Schrank, Seiberling Rubber Co., all of Akron, O.

Also created was a Copper Wire & Cable Industry Advisory Committee with Francis R. Kenney as government presiding officer. Other members follow: W. E. Sprackling, Anaconda Wire & Cable Co., New York; D. R. G. Palmer, General Cable Corp., New York; H. L. Erlicher, General Electric Co., Schenectady, N. Y.; Wiley Brown, Phelps Dodge Copper Products Corp., New York; C. A. Scott, Rome Cable Corp., Rome, N. Y.; F. C. Jones, Okonite Co., Passaic, N. J.; Everett Morss, Simplex Wire & Cable Co., Cambridge, Mass.

George W. Smith, formerly New England representative for The Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York, N. Y., is now a member of the Chemicals Division of the WPB.

Among the members of the recently named Zinc Producers Industry Advisory Committee are: Frank E. Chesney, purchasing agent, American Steel & Wire Co., Cleveland, O.; Irwin H. Cornell, vice president, St. Joseph Lead Co., New York, N. Y.; Marshall L. Havey, vice president, New Jersey Zinc Co., New York; C. H. Klaustermeyer, manager, metals and ore division, Grasselli Chemical Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; Howard I. Young, president, American Zinc Lead & Smelting Co., St. Louis, Mo.

Among those named to the recently created Lead Pigment Manufacturers Industry Advisory Committee were C. H. Rupprecht, of Krebs Pigments Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; and Fletcher W. Rockwell, of National Lead Co., New York, N. Y., who is also on the Metallic Lead Products Manufacturers Industry Advisory Committee.

C. H. Crane, of St. Joseph Lead Co., New York, N. Y., is on the recently formed Primary Lead Producers Industry Advisory Committee.

A realinement of the WPB, announced July 8, is designed to tie the economic and military strategies more closely together and to make more effective the Board's determinations of policies and programs governing the flow of materials. Two vice chairmen have been provided: Wm. L. Batt, former chairman of the Requirements Committee, who will act as general assistant and deputy to WPB Chairman Donald Nelson; and James S. Knowlson, former Director of Industry Operations, who will be responsible for program determinations, serve as Mr. Nelson's deputy on the Combined Production and Resources Board, and be chairman of the Requirements Committee, of which Mr. Batt remains a member. All of the operational work has been brought together under a Director General of Operations, Amory Houghton, formerly Deputy Chief of the Bureau of Industry Branches. The work of checking up to see that programs are properly carried out has been entrusted to a Deputy Chairman on Program Progress. Also created has been a Smaller War Plants Corp., the Procurement Policy Division (formerly the Division of Purchases), a Construction Program Division, Production Engineering Division, and a Facilities Utilization Division.

WPB on July 15 dissolved its Special Industrial Machinery Branch and assigned its work to other branches. Under the new set-up the Chemicals Branch will have supervision over plastics machinery, and the Rubber Branch will have charge of tire molding machinery; textile and shoe machinery has been transferred to the Textile, Clothing, and Leather Branch.

Other WPB Orders

Conservation Order No. M-81, as amended June 27, prohibits the use of tinplate and terneplate cans for rubber cements, many chemicals, and other products.

Conservation Order M-184, issued July 13, controls the distribution of aniline, aniline oil, and salts of aniline, starting September 1, 1942.

Conservation Order M-126 as Amended July 13, 1942, prohibits the manufacture of an additional long list of civilian articles requiring iron and steel. No other metal or rubber may be used to manufacture any of the banned products.

General Limitation Order No. L-136, issued June 14, curtails, in the manufacture of church goods, the use of critical materials, including rubber.

General Preference Order No. M-154, issued June 27, placed thermoplastics, including polymers of styrene, polymers of vinyl alcohol, and polymers of vinylidene chloride under allocation control. Orders will be filled in the following rotation: war orders, equipment for essential industries, commercial equipment, and essential personal items. The less essential commercial, household, and personal items will be eliminated after September 1.

General Preference Order No. M-178, issued June 27 and effective July 1, placed butadiene under allocation from producers. Producers who make less than five tons a month are exempted from the order.

Limitation Order L-159, announced July 9, restricts production and delivery of new plastics-molding machinery.

Amendment No. 2 to Priorities Regulation No. 11, issued June 22, redefines the permissible use of ratings by companies operating under the Production Requirements Plan, and clarifies the interim procedure to be followed by companies which have not yet received a PRP certificate.

Priorities Regulation No. 13, issued July 7, frees for vital war production hundreds of tons of critical materials frozen in idle inventories. In effect this regulation sets up new and uniform rules governing the sale of idle inventories of certain kinds and removes such specified sales from existing regulations that affect the normal flow of materials. Restrictions set by limitation orders are now replaced by the conditions established in the new regulation, which controls all sales of restricted material including those sold in liquidation and bankruptcy proceedings.

Other WPB Notes

The Heat Exchanger Industry Advisory Committee is seeking facilities capable of producing $200,000,000 worth of heat exchangers (condensers, coolers, feed water heaters, and other such equipment) needed for the manufacture of chemicals for synthetic rubber and other war products before July 1, 1943.

A new survey of WBP orders issued during the first half of 1942 reveals that hundreds of household items and other civilian goods once considered almost in the essential class have already been taken off the nation's production lines and that, when present inventories are depleted, civilians will have to find substitutes or do with what they have as best they can. Under these measures a vast amount of strategic materials has been made available for the war effort. Among the annual savings estimated are the following relating to rubber: domestic mechanical refrigerators, 4,300 tons; domestic washing machines and ironers, 4,760 tons; electrical appliances, 1,400 tons; vacuum cleaners, 963 tons; bicycles, 4,700 tons; fountain pens and mechanical pencils, 267 tons; sewing machines, less than 175 tons.

OPA Announcements

Amendment No. 3 to Maximum Price Regulation No. 107—Used Tires and Tubes—issued July 6 and effective July 11, sets maximum prices for "special purpose" used inner tubes higher than those applicable to ordinary used tires. Brand names also are listed for these tubes of special construction, designated "double-walled", puncture-sealing", "self-sealing", etc. Although they usually sell, new, for prices much above those for conventional tubes, the Regulation, as originally issued, made no special provision for them for sale at second-hand. This amendment sets maximum prices for passenger-car and truck sizes at levels about 50% of the average list prices for such tubes new, and substantially above the ceilings for used ordinary tubes. Thus a used 6.00-16 "special purpose" tube of any of the brand names listed in the regulation, for instance, may be sold for $5.45, compared with $1.50 for the ordinary passenger-car tube and $2 for a truck tube of the same size. The ceilings in Amendment No. 3 range from $3 for a used "special purpose" tube for a 4.00-18 tire to $23 for a tube for a 12.75/13.00-24 tire.

Amendment No. 3 (issued July 23 and effective July 24) to Revised Price Schedule 63—Retail Prices for New Rubber Tires and Tubes—and Amendment No. 1 to Maximum Price Regulation No. 143 (wholesale prices) warns that retailers and wholesalers of new rubber tires and tubes are licensed under the General Maximum Price Regulation and may have their licenses to do business revoked for violation of the price schedules under which they operate.

Supplementary Order No. 6 to the General Maximum Price Regulation, issued June 19 and effective June 25, permits sellers whose ceilings are set under certain Maximum Price Regulations the option of continuing the type of posting set forth in the particular commodity price regulation or of using any of the posting methods permitted in the General Maximum Price Regulation. These regulations include: Maximum Price Regulation No. 63 (retail price for new tires and tubes); No. 66 (retreaded and recapped rubber tires, the retreading and recapping of rubber tires, and basic tire carcasses; No. 107 (used tires and tubes).

Amendment No. 7 to the General Maximum Price Regulation, issued June 19 and effective June 25, alters provisions on taxes, licensing, and registration; brings jobbers and distributers under the definition of "wholesaler" for purposes of determining maximum prices; and frees government war procurement agencies from delay in determining whether their purchases are at prices in conformity with the General Maximum Price Regulation.

Amendment No. 5 to Supplementary Regulation No. 4, General Maximum Price Regulation, issued and effective June 23, excludes from the General Maximum Price Regulation purchases by the United States Government for immediate delivery for which there is an emergency need.

Revised Ration Order No. 7—New Adult Bicycle Ration Regulations, issued July 1 and effective July 9, inaugurated general rationing of bicycles to persons needing them in their work or to travel to and from their places of employment.

To Eliminate Tire Abuse

Steps to save rubber being wasted by ignorance of tire care and by deliberate abuse and neglect are being taken by the OPA. Inspectors who examine tires of applicants for rationing certificates have been given instructions to help determine when a tire is repairable and recappable and when it has been neglected or abused. This action is intended to give force to a provision in the tire rationing regulations that permits local War Price and Rationing Boards to refuse tires to any who have abused those they already have or who have driven them beyond the point where recapping is practical.

Spot checks by tire experts have shown that overloading, underinflating, bad braking or poor wheel alignment has made scrap rubber of many a tire that, except for these abuses, could have been rescued for further useful life by application of only a fraction of its weight in recapping material. It is this waste that OPA wants to stop.

Local boards, in their discretion, may refuse to grant certificates to applicants when the inspector's report shows: (1) The tires to be replaced have been run beyond the point where they can be repaired or recapped. (Specifications have been drafted to determine what that point is.) (2) Tread plies have become separated owing to overloading, neglect in keeping tires properly inflated, or operation at high speeds. (3) The casing has been damaged by running flat. (4) Dual tires have been improperly matched. (5) Wheels are out of alinement. (6) The tire has been damaged by uneven braking. (7) Spotty wear indicates the tire has been run on a bent rim.

It is recognized that the above standards are not absolute and that there may be mitigating circumstances. The local board may withhold action under the abuse standards if the applicant can show he has corrected conditions resulting in abused tires.

Specific directions as to when a tire should be removed for recapping have been given tire inspectors by the OPA. The most economical point for recapping either a passenger-car or truck tire, according to their instructions, is when the casing is worn smooth approximately three-fourths of the total width of the tread and not beyond the point where there still remains 1/8-inch of tread rubber above the breaker strip. However tires showing considerably more wear than this, and even those that have minor carcass damage, are considered economically recappable, although not so serviceable as those removed in time. A damaged tire is recappable when it does not require more than two sectional repairs of breaks or cuts. When the lesions are more than three inches long, however, or are below the point where the sidewall of the tire contacts the top of the rim flange, the casing cannot be recapped satisfactorily. This applies to truck as well as to passenger-car tires. Truck tires, because of their heavier fabric construction, may be worn somewhat farther than passenger-car casings and still be fit for recapping. The ultimate wear for a passenger-car tire is through one body ply of cord fabric; while truck tires worn through two plies may be recapped. Besides wear beyond the ultimate points designated, and cuts and breaks more extensive than those described as repairable in the instructions, four other kinds of damage make tires unfit for recapping: (1) ply separation; (2) broken or exposed bead wires; (3) failure at the bead reenforcement; (4) separation of cord in inside ply.

Inspectors are required to report cases of abuse to the local board.

Legal Actions

OPA on July 2 in Order No. 1 denied a request by Pennsylvania Rubber Co., Jeannette, Pa., for permission to establish ceiling prices on original equipment tires and tubes at a level higher than that provided generally in Maximum Price Regulation No. 119. The company had asked for a price ceiling 5% above its published original equipment price list effective December 31, 1941, instead of 5% above the highest price charged by it for equipment of the same kind during 1941, as is provided in the Regulation. The company said its 1941 prices were not representative, as they applied to what was then an inconsiderable portion of its total business. This year, however, the company stated, original equipment has come to represent a materially larger share of total sales. It asked for an exception to the Regulation under a section providing for adjustment in the case of high-cost producers. Maximum prices applicable under the terms of the Regulation, the company contended, are below the level which OPA has set for other suppliers who made no sales or offers to sell original equipment tires and tubes last year. The Administrator denied the petition because there was no showing that the company's production costs are high in comparison with the average operating cost in the industry.

A protest by United States Rubber Co. against the maximum retail prices established for its two extra-quality tires, the "U. S. Royal Master" and the "Fisk Safti-Flight," was dismissed by OPA on July 8 on the grounds that it had not been made within 60 days after the effective date of the revised schedule, as should have been to comply with provisions of the Emergency Price Control Act of 1942 under which OPA operates, and also that U. S. Rubber, a manufacturer, is not subject to the regulation, which applies only to retail sales. In dismissing the company's protest, however, the Price Administrator said he would treat it as a petition for amendment of Revised Price Schedule No. 63. Under the provisions of the schedule, retail ceiling prices for tires of premium grades are determined by application of a formula which relates their price to the maximum levels for ordinary first line tires.

In the first action against a tire retreader found guilty of violating OPA rationing regulations, Deputy Administrator Paul M. O'Leary on July 20 suspended recapping and retreading operations of the Durham Tire Exchange, Durham, N. C., from July 20 to September 19 and ordered return by July 20, of more than a ton of camelback

acquired illegally, to Gate City Motor Co., Greensboro, N. C., or to the United States Rubber Co. According to the suspension order the company represented last February in an application to buy camelback that it had four truck tire molds, whereas it only had one. In consequence it obtained an excess supply of 2,200 pounds.

Quota Figures

A larger tire and tube quota for July (see page 512) than June was announced June 28, reflecting normal seasonal factors and increasing employment of workers in war occupations which make them eligible for tires under rationing regulations.

A quota of new Grade II tires—third, fourth, and fifth lines—has been set up for war workers whose casings are unfit for recapping, the first quota of new tires of any kind for any List B eligibles. Certificates were not granted against this quota until mid-July and then only to those working in establishments employing over 100 workers where a special plant committee has been organized to certify that applicants are eligible for tires and carry the practicable maximum load of other workers with them to and from work.

The July passenger-car tire quota figures for the states and territories show 57,097 new tires for List A eligibles, 23,402 new Grade II tires for the special war worker classification, 555,077 recaps, and 323,087 inner tubes. In all instances, these figures represent increases over June quotas, which made available 49,584 new tires, 479,051 recaps, and 265,007 tubes.

Truck tire quotas for July provide more new tires than were allotted for June, but less recaps and inner tubes were available. The quota of new truck tires for July was 268,925, compared with 247,715 in June, while the recap quota was 314,896, against 365,014; and the tube quota, 299,265, against 309,116.

August quotas (see page 512) were even higher than for July because of increasing applications by essential vehicle operators for rationing certificates. Total quotas follow: *passenger-car tires:* List A, 58,503; Grade II new tires for special war worker classification, 87,860; recapped tires on recapping services, 637,959; inner tubes, 418,910; *truck and other heavy-vehicle tires:* new tires, 316,695; recapped tires or recapping services, 355,883; inner tubes, 347,696.

Tire Rationing Regulations Revised

Several additional amendments have been added to the Revised Tire Rationing Regulations—Tires and Tubes, Retreading and Recapping of Tires, and Camelback Amendment No. 17 (June 29) tightens requirements in some respects and extends eligibility for tires to certain automobile users not heretofore provided for. The eighteenth amendment, effective June 30, requires that tire sellers report to their local boards by July 15 their inventories of all serviceable tires and tubes—new, used, retreaded, and recapped—as of June 30. (A notice issued later in the month extended the due date from July 15 to July 25.) Besides for each quarter thereafter an inventory report must also be filed. Amendment 19, issued July 8 and effective July 15, provides that purchasers of new and rebuilt tractors, farm implements, and other vehicles sold without tires will be able to secure casings and tubes for them under certain conditions. The next amendment, also released July 8 to take effect July 15, redefines Grade II tires (third, fourth, and fifth line new tires available to plant workers who obtain the necessary certificates for them) as those with a maximum price of less than 85% of the ceiling for first line tires established in Price Schedule No. 63, Revised, as against the previous 88½%, which definition embraced many tires held to be second line. Amendment No. 21, issued July 18 and effective a week later, grants, under specified terms, to Army and Navy personnel recapped tires for passenger cars used principally in necessary transportation between residence and post of duty or on official military business where no military vehicle is available. Only trucks engaged in services essential to the war effort or public health and safety are entitled to recapped or new tires, starting July 28, under a drastic revision of tire rationing regulations, embodied in Amendment 22, issued July 20.

New Appointments

Robert F. Bryan was appointed, July 11, price executive in charge of the Rubber Price Branch of OPA, having been for several months associate price executive. He succeeds Ben W. Lewis, now a special representative aiding in field price administration. Mr. Bryan has been active in the formation of rubber products price policies since he became associated with OPA and its predecessor organization more than a year ago.

The OPA last month created a Labor Office with Robert R. R. Brooks, formerly with the WPB, as director. The new office will act as liaison agency between organized labor and the OPA.

RMA Offers Civilian Tires Plan

A plan to provide tires for civilian automobiles for a two-year period beginning July 1, 1942, was made public July 21 by the committee of the directors of the Rubber Manufacturers' Association for passenger car transportation. The success of the plan is predicated in part upon a reduction of average passenger car mileage by 40% under 1941 and a reduction of maximum speeds to 40 miles an hour.

Tire and recap units recommended by the committee follow:

Period	Pre-War Tires from Inventory	New Tires of Reclaim, "Thiokol", or Butyl	Recaps	Total Ration Units
July 1, 1942-June 30, 1943	2,330,000	4,796,000	10,688,000	17,814,000
July 1, 1943-June 30, 1944	2,330,000	8,427,000	19,603,000	30,360,000
Total	4,660,000	13,223,000	30,291,000	48,174,000

(Note: An estimated 10,000,000 pre-war tubes in inventories, and repair of tubes now in use, should make further tube production unnecessary for two years, unless an unbalanced size condition occurs.)

Raw materials requirements of the plan include:

Period	Crude Rubber	Reclaim Rubber	"Thiokol"	Butyl
	(Long Tons)			
July 1, 1942-June 30, 1943	1,189	48,769	10,688	2,475
July 1, 1943-June 30, 1944	2,143	48,651	22,500	30,000
Total	3,332	97,420	33,188	32,475

The tonnages stated above are based by the committee on the assumption that 75% of the anticipated "Thiokol" and Butyl production will be made available for passenger tires. If more than 75% is released, or if projected capacities are expanded, "Thiokol" can be substituted for the stated requirements of reclaimed rubber on the basis of 100 tons of "Thiokol" for each 80 tons of reclaim, and Butyl can be substituted in the ratio of 100 tons for each 140 tons of reclaim. This plan leaves for military and non-tire civilian use nearly all the crude rubber supplies, more than 85% of the reclaim capacity, all projected Buna S and neoprene capacity, and a portion of the expected "Thiokol" and Butyl production.

The plan also provides for denial of ration certificates to persons who wilfully abuse tires, exceed speed limits, and otherwise fail to conserve tires.

Newhall Questions RMA Plan

Commenting July 22 on the plan, Arthur B. Newhall, rubber coordinator, said the proposal was full of "ifs." At a press conference he stated that it was not certain that the amounts suggested by the RMA committee can be spared for civilian use and that the present program does not envisage the amounts of synthetics the rubber companies are asking in the first year. His statement reiterated that there was no rubber of any kind available except for the most essential purposes. Finally he said:

"If we can spare the reclaimed rubber, the crude rubber, the "Thiokol," and the Butyl, and if all motorists would engage only in essential driving, and if motorists will cut speeds to 40 miles an hour and if they take the best care of their tires—then, and only then, could this or any other such plan be adopted."

Emergency Federal Specifications Issued

Emergency alternate federal specifications for rubber tubing and pneumatic automobile and motorcycle tires have been approved by the Procurement Division of the United States Treasury Department for use by all government establishments. The tires specification, E-ZZ-T-381D, is in accordance with the limitations of WPB rubber restriction orders and their amendments. The tubing specification, E-ZZ-T-831b, issued June 17 supersedes one issued March 31, 1942, the date of the tires emergency specification.

Colombia, Bolivia, and Ecuador Sign Rubber Agreements with U. S.

Last month the United States Department of State, the Rubber Reserve Co., and the Board of Economic Warfare, all of Washington, D. C., announced signing of rubber agreements with Colombia (July 3), Bolivia (July 15), and Ecuador (July 21). Under the terms of the agreement Rubber Reserve during the next five years will purchase all rubber produced in Colombia and Ecuador which is not required for essential domestic needs there. The same holds true for Bolivia except for a further exemption of a maximum of 250 tons a year to be available for export to neighboring countries.

Colombia has been producing and exporting relatively small quantities of rubber. It is expected that eventually, with development of potential resources, somewhat larger supplies will be available annually. It is further reported that under the agreement the United States will help in developing rubber production with $1,000,000 in Reconstruction Finance Corp. funds to be made available.

Terms with Bolivia provide also for the expenditure of $2,125,000 by Rubber Reserve in the development of rubber resources there. It is also reported that the United States promised machinery to producers.

Rubber output in Bolivia this year is estimated at 2,000 tons, and in 1943 a potential of 2,500 to 3,000 tons is anticipated. The price was reportedly set on a sliding scale ranging up to 45¢ a pound for the best grades.

Ecuador has been producing and exporting relatively small quantities of rubber. Several hundred tons now in warehouses will be taken over by Rubber Reserve under the agreement. It is expected that eventually, with development of potential resources, somewhat larger supplies will be available each year. A price of 33¢ a pound was reported.

The United States had previously signed rubber agreements with Brazil, Peru, Nicaragua, and Costa Rica. Negotiations for similar agreements are proceeding with other American rubber producing countries.

To Grow Rubber in Central America

The United Fruit Co., New York, N. Y., on July 20 announced a new fundamental policy: that of extension of production in Middle America of certain essential tropical crops needed by the United States to make us less dependent on the Far East. These crops include natural rubber, abacá or manila hemp, quinine, palm oil, and other tropical products heretofore imported principally from the Pacific Tropics. Countries in which these crops will first be introduced include Guatemala, Honduras, Nicaragua, Costa Rica, and Panama.

The announcement states: "In the belief that the fundamental basis of a balanced economy in Middle America is dependent upon the maintenance of a stable, prosperous and contented agricultural population in those countries, this company has for several years been experimenting with the growing of various commodities which might be grown by the small farmer. Such crops, aside from furnishing a new source of income for the farmer, would provide a new source of supply for many commodities formerly imported from the Far East, and with the projected improvements in transportation, might, if necessary, be imported into the United States by railroad, truck, or even airplane. The cutting off of supplies from the Far East by Japanese aggression has made these experiments particularly timely. We are now convinced that rubber, abacá, quinine, palm oil, and several other tropical products can be successfully produced in Middle American countries. It is and will continue to be a fundamental policy of this company to utilize its organization and its tropical resources to assist the native population in growing such products without expectation of profit to the company other than good will from friendly neighbors.

"An agricultural school now being constructed by this company in Honduras will be open to students from Central America and will be properly equipped and provided with competent instructors to teach the young men from these countries how best to meet the problems connected with growing these crops. Once this movement is well under way, the resulting increase in the purchasing power of the countries interested will mean a higher standard of living for them and a greatly increased market for the farmer, the manufacturer, and the business man in general in this country."

In June the company's board appropriated funds to establish a 1,000-acre *Hevea* rubber plantation on its lands in Honduras.

On its first experimental rubber plantation company workers are planting the seed and nursery stock of selected high-yielding *Hevea* strains which have produced from 1,200 to 1,900 pounds of crude annually per acre within 10 years. It has been found that *Hevea* rubber is well suited to banana lands, as the rubber trees benefit from the primary drainage essential to banana raising, and by the slightly acid soils resulting from banana cultivation.

The United Fruit Co. is establishing model plantings of *Hevea* rubber. The knowledge obtained from these experimental plantings will be passed along to citizen farmers of Middle America, and demonstration farms of *Hevea* will be developed which Middle Americans will have opportunity to observe. Approved planting stock of *Hevea* rubber will be distributed, and, what is more, outright substantial acreages of former banana lands will be given to deserving citizen farmers of Middle America who wish to produce rubber crops.

The United Fruit Co. is not going into the rubber business. It intends to help Middle Americans who desire to go into this business. The same holds for other essential crops.

Retreading Substitutes Studied

Rubber, chemical, and automobile companies have pooled their resources to develop a material suitable for retreading worn tire casings in an effort to extend the life of civilian tires which may have to last for the war's duration and to supply the armed forces which undoubtedly will require vast quantities of retreading compound. An industrial committee has studied many chemicals and has completed a preliminary report on available ones. A complete report is expected to be made soon to the government. The committee, an offshoot of the S.A.E. War Emergency Board, includes E. B. Babcock (Firestone), S. M. Cadwell (U. S. Rubber), R. P. Dinsmore (Goodyear), Howard E. Fritz (Goodrich), and representatives of the Dunlop Rubber Co., E. I. du Pont de Nemours & Co., Inc., Hercules Powder Co., Inc., Thiokol Corp., The General Tire & Rubber Co., and the Seiberling Rubber Co.

Among the materials under consideration for retreads is "Thiokol" Type N, which the committee report describes as a "fair" substitute for rubber. "Thiokol" retreads are expected to wear for between 5,000 to 10,000 miles at speeds below 40 miles an hour. The cost has been estimated at between $6 and $8 a tire for retreading. This price is reported as competitive with camelback. "Thiokol" Type N, it is claimed, can be made quickly in large quantities by equipment made of wood and cast-iron and from chemicals that are fairly plentiful. Of the four basic ingredients chlorine is under allocation. Caustic soda is expected to be derived from salt; ethylene from alcohol which may be made from oil, grain, or agricultural waste; sulphur is in good supply.

A small pilot plant producing five tons of Type N a month has been in operation for several weeks; a semi-commercial unit with a capacity of 125 tons monthly is expected to be in production August 1. The latter development should produce appreciable amounts of "Thiokol" Type N for further evaluation of the material in retreads and also provide necessary experience and "know how" for operation of a 2,500-tons-a-month plant scheduled to begin production early in 1943.

It is understood that the Reconstruction Finance Corp. has issued a "letter of intent" to the Dow Chemical Co., covering the production of an unstated amount of the "Thiokol" tread material. The War Production Board is not expected to object to plans to retread civilian tires with it.

The committee's technical report also points out that an emergency type of butyl rubber, suitable for retreads and complete tires, could be put into production in the not-distant future, but, at the present, it cannot be made so cheaply, so quickly, or in so large quantities as "Thiokol" Type N.

ADDITIONAL RUBBER ORDERS

Conservation Order No. M-174[1]

The fulfillment of requirements for the defense of the United States has created a shortage in the supply of elastic fabrics for defense, for private account, and for export, and the following Order is deemed necessary and appropriate in the public interest and to promote the national welfare.

SECTION 1279.1 — CONSERVATION ORDER NO. M-174. (a) *Applicability of Priorities Regulation No. 1.* This Order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1 (Part 944), as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this Order will govern.

(b) *Additional Definitions.* For the purpose of this Order:

(1) "Elastic Fabric" means any fabrics, knitted, woven or braided, containing rubber core or covered rubber thread.

(2) "To Consume" means to commence to sew on any garment or other article, or otherwise attach thereto any elastic fabric, or to begin the processing, cutting, or changing in any manner of the form of any elastic fabric.

(c) *Restrictions on Use.* No person shall consume any elastic fabric except in the manufacture of the following items:

Edging for baby pants
Industrial shoes, belting and flexible metallic hose
Repair cords and webs manufactured from rubber thread of the sizes permitted by Conservation Order No. M-124 or from scrap or tag ends of less than five feet in length
Sanitary belts subject to the provisions of Order L-137 as from time to time amended
Surgical elastic bandages
Surgical stockings
Supports for abdomen, back and breast subject to the provisions of Order L-90 as from time to time amended
Trusses (including umbilical belts)
Webbing for respirators, hose masks, gas masks, inhalators, and goggles

provided, however, that the quantity of elastic fabric to be used in the manufacture of any of the above items shall be regulated by the provisions of any General Limitation or other Orders now in effect or as may from time to time become effective with respect thereto.

(d) *General Exceptions.* The restrictions imposed by paragraph (c) shall not apply to:

(1) Any elastic fabric to be used for the purpose of filling actual orders for, or contracts held by any person with:

(i) The Army or Navy of the United States, the United States Maritime Commission, War Shipping Administration, the Panama Canal, the Coast and Geodetic Survey, the Coast Guard, the Civil Aeronautics Authority, the National Advisory Committee for Aeronautics, the Office of Scientific Research and Development; or

(ii) The government of any of the following countries: The United Kingdom, Canada, and other Dominions, Crown Colonies and Protectorates of the British Empire, Belgium, China, Greece, the Kingdom of the Netherlands, Norway, Poland, Russia, Yugoslavia, Free France, Iceland, Turkey, and Czechoslovakia for military purposes only.

(2) Any elastic fabrics which, on or before the opening of business on June 20, 1942, were already packaged in the customary retail packaging of such fabrics, where such packaging differs in both put-up and amount of fabric from the packaging of the same fabric for distribution to processors, manufacturers, or any persons other than retail distributors or persons selling to retail distributors.

(3) Any elastic fabric which can be shown to the satisfaction of the Director of Industry Operations to be unsuitable or unnecessary as substitutes in the production of any of the articles listed in paragraph (c) or contracted for pursuant to paragraph (d) (1). Applications for such exceptions shall be in writing, stating the complete specifications of each item covered by the application, and shall be accompanied by samples of at least three feet in length of each such item. Such exceptions may be made in special cases or by supplemental Order as public interest and the national defense may require, and may contain such restrictions on the rate of use thereof as may be necessary and appropriate in the public interest and to promote the national defense.

(4) Any person who has, in good faith, filed application pursuant to paragraph (3) hereof, may, pending action on such application, use an amount of each elastic fabric held by him not in excess of 10% of his inventory thereof on June 20, 1942; *provided* that no such person shall use in the manufacture of any article more than 15% by area of the type of elastic fabrics, or any type using less rubber thread, used by such person in the manufacture of each article in May, 1941, unless the said limitation to 15% would require the use of narrow elastic fabrics in lengths of less than three inches, in which case lengths of three inches of any narrow elastic fabric may be used up to an amount equal to 10% of the inventory thereof.

(e) *Appeals.* Any person affected by this Order who considers that compliance therewith would work an exceptional and unreasonable hardship upon him, or that it would result in a degree of unemployment which would be unreasonably disproportionate compared with the amount of elastic fabrics conserved, or that compliance with this Order would disrupt or impair a program of conversion from non-defense to defense work, may appeal to the War Production Board by letter or telegram, setting forth the pertinent facts and the reason he considers he is entitled to relief. The Director of Industry Operations may thereupon take such action as he deems appropriate.

(f) *Reports.* Each manufacturer, processor, wholesaler, or jobber shall compile and retain an inventory of elastic fabrics as of the opening of business on June, 1940, and shall file such reports with the War Production Board as may be required by such Board from time to time; but no such reports shall be filed until forms therefor have been prescribed and made available.

(g) *Records.* All persons affected by this Order shall keep and preserve for not less than two years accurate and complete records concerning inventories, consumption and sales.

(h) *Communications to the War Production Board.* All reports required to be filed hereunder, and all communications concerning this Order shall, unless otherwise directed be addressed to:

"War Production Board
Washington, D. C.
Ref: M-174"

(i) *Violations.* Any person who wilfully violates any provision of this Order, or who, in connection with this Order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

(j) *Effective Date.* This Order shall take effect on June 24th, 1942, at 12:01 a. m.

Issued this 20th day of June, 1942.

J. S. KNOWLSON
Director of Industry Operations

Amendment No. 1

Paragraph (d) (4) is hereby amended by repealing the proviso therein so that the paragraph reads as follows:

"(4) Any person who has, in good faith, filed application pursuant to paragraph (3) hereof, may, pending action on such application, use an amount of each elastic fabric held by him not in excess of 10% of his inventory thereof on June 20, 1942."

Issued this 27th day of June, 1942.

J. S. KNOWLSON
Director of Industry Operations

[1] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations, Part 1279—Elastic Fabrics, Knitted, Woven or Braided.

Amendment No. 7 to Supplementary Order No. M-15-b-1 to Restrict the Use and Sale of Rubber[2]

Section 940.5 (Supplementary Order No. M-15-b-1) is hereby amended as follows:

1. By inserting the following new subparagraph immediately after subparagraph (b) (16) thereof:

(17) Airplane Tires — List 17

2. By attaching thereto the attached additional list designated List 17.

This order shall take effect as of the date of its issuance.

Issued this 1st day of July, 1942.

J. S. KNOWLSON
Director of Industry Operations

[2] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations, Part 940—Rubber and Products and Materials of Which Rubber Is a Component.

SUPPLEMENTARY ORDER NO. M-15-b-1, AS AMENDED

List 17

Specifications for the manufacture of airplane tires.

(a) The following specifications shall be followed in the manufacture of airplane tires to fill all purchase orders, including War Orders and orders placed by or for the account of any other department or agency of the Government of the United States.

(b) Compounds used in the manufacture of airplane tire casings shall be prepared in accordance with the specifications set forth in subdivision (a) of List 7, as amended from time to time, attached to Supplemenary Order No. M-15-b-1.

(c) Airplane tire casings shall be made only in the sizes hereinafter listed.

(d) The friction and the tread, respectively, of each of the classes of airplane tire casings listed below shall be made from one of the grades of compounds listed in subdivision (a) of said List 7, the appropriate grade of compound to be used for each such respective friction or tread being that hereinbelow specified therefor opposite the description or designation of such class.

Description of Product		Compounds to Be Used	
Size	Ply	Truck Friction	Tread
Smooth Contour			
Landing Wheels			
27	8	B	B
30	8	B	B
33	8	B	B
36	10	B	B
39	10	B	B
44	10	A	A
47	12	A	A
51	14	A	A
56	16	A	A
65	16	A	A
Auxiliary Wheels			
8.00	4	B	B
10.00	6	B	B
12.50	6	B	B
14.50	6	B	B
17.00	6	B	B
19.00	6	B	B
23.00	8	B	B
26.00	10	A	B
30.00	10	A	B
High Pressure			
Landing Wheels			
26x6-14	8	A	B
30x5-20	*4	C	C
30x7-16	8	A	B
32x6-20	*4	C	C
32x8-16	8	A	B
36x8-20	*6	C	C
34x9-16	10	A	B
36x10-16	10	A	A
38x10-18	12	A	A
40x10-20	*8	C	C
Auxiliary Wheels			
10½-4	6	B	B
12½-4½	8	B	B
10x3-4	*4	C	B
Low Pressure			
Landing Wheels			
20x7.00-6	4	C	B
22x6.50-10	6	C	B
24x7.50-10	6	C	B
26x8.50-10	6	B	B
39x13.50-16	10	B	B
42x15.00-16	10	B	B
42x15.00-16	†8	B	A
44x16.00-16	10	B	B
45x17.00-16	10	B	B
45x17.00-16	†10	B	A
45x18.00-16	12	B	B
45x20.00-18	12	B	B
46x15.50-20	12	B	B
50x17.00-20	12	A	A
55x19.00-23	16	A	A
Auxiliary Wheels			
13x5.00-4	6	B	B
17x6.00-6	4	C	B
16x7.00-4	4	C	B
17x7.00-5	4	C	B
17½x8.00-4	4	C	B
19x8.00-5	6	C	B
19x8.00-5	4 H.D.	C	B
22x9.00-6	8	B	B
24x10.00-7	10	B	A
29x9.50-12	‡6	B	B
32x11.00-12	8	C	C
36x12.50-14	‡10	B	B
Extra Low Pressure			
Landing Wheels			
25x11-4		B	B
29x13-5		B	B
30x13-6		B	B
35x15-6		B	B
45x20-10		B	A

*Inactive for new design.
†Air line use only.
‡Beaching gear tires only.

Description of Product		Compounds to Be Used	
Size	Ply	Truck Friction	Tread
Auxiliary Wheels			
12x5-3	4	B	B
16x7-3	4	B	B
18x8-3	4	B	B
Streamline			
Landing Wheels*			
24	4	C	B
27	6	B	B
31	6	C	C
36	6	C	C
40	8	C	C
45	8	C	C
50	8	C	C
27.50x8.90-12.50	4	C	B
Low Profile			
Auxiliary Wheels			
19x6.80-10	6	B	B
22x7.25-11.50	6	B	B
26x9.00-13.00	8	B	B
33x11.50-16.50	10	B	B
Cushion			
Auxiliary Tires			
6x2.00			A
8x2.50			A
Solid			
Auxiliary Tires			
6x2½			A
6x3½*			A
8½x4			A
10x3*			A
10x4*			A

Amendment No. 8[2]

Section 940.5 Supplementary Order M-15-b-1 is hereby amended by substituting the attached list designated List 12 for List 12 now attached thereto.

This order shall take effect as of the date of its issuance. (P.D. Reg. 1, as amended, 6 F.R. 6080; W.P.B. Reg. 1, 7 F. R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (a), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Issued this 10th day of July 1942.

J. S. KNOWLSON

Director of Industry Operations

List 12

[Revised effective July 10, 1942]

Specifications for the manufacture of insulated wire and cable. No person shall consume Rubber, Latex or Reclaimed or Scrap Rubber in the manufacture of insulated wire and cable enumerated below in subdivision (b) except in accordance with the specifications herein prescribed unless expressly exempted in paragraph (1) of subdivision (b) hereof.

Compounds and constructions specified herein in subdivisions (a) and (b) for insulated wire and cable shall be used to fill all orders, including War Orders and orders placed by any department or agency of the United States Government, except as expressly exempted in paragraph (1) of subdivision (b) hereof.

(a) *Compounds*

Use	Compound Grade	Maximum % by Volume of Crude Rubber	Maximum % by Volume of Total RHC	Performance Reference
(1) Insulation	W-A	55	65	Performance Type RP or ASTM-D-353-1941.
	W-B	35	50	ASTM-EA-D-353. ASTM-EA-D-574.
	W-C	13	55	N.E.C. grade—2/11/42.
(2) Jackets.	W-D	50	75	ASTM-EA-D-532.

(i) The total rubber hydrocarbon (RHC) is the sum total of the crude rubber and the rubber value of the reclaimed rubber expressed on a volume basis.

(ii) If the per cent. by volume of crude rubber is reduced below the maximum specified, it is permissible to substitute an equivalent amount of rubber hydrocarbon (RHC) in the form of reclaimed rubber, but in no case shall the specified maximum percentage of total rubber hydrocarbon (RHC) be exceeded.

(iii) The performance references are given for the purpose of guidance as to performance expectation and represent typical compounds, but they do not form a part of this Order.

(b) *Insulated Wire and Cable.*

(1) *Exceptions.* The specifications hereinafter set forth need not be followed in the manufacture of insulated wire and cable of the following types:

(i) Submarine cable designed for communications, light and power.

(ii) Oil and gas well logging cable.

(iii) Military field communication wire, search light and fire control cable and Radar Detector Cable.

(iv) Cord and cable designed for naval shipboard use, aviation use or for use on guns or other weapons.

(v) Rubber compound tape designed for splicing and terminal use with products listed in (i) (ii), (iii) and (iv) above.

(vi) Any other type of insulated wire and cable, provided the purchase order is accompanied by a certificate signed by a contracting or inspecting official of the Army, Navy, Maritime Commission, or other governmental agency listed in subparagraphs (a) (4) (i) (aa) or (a) (4) (ii) of Supplementary Order No. M-15-b, as amended, certifying that the use of compounds specified by this Order is inadequate and that the use of the compounds specified by the purchase order is necessary for direct military or naval use.

(2) *Wire and cable.* Insulations and jackets of each of the classes of wire and cable listed below shall be made from one of the grades of compounds listed in subdivision (a) of this specification, the appropriate grade of compound to be used for insulation or jacket being that hereinbelow specified opposite the description or designation of such class.

(*Continued on page 508*)

Type of Service	Outer Covering	Operating Voltage	Compounds for Insulation	Compounds for Jacket
(i) Building wire, telephone drop wire, police and fire alarm systems, and general service designed for use in dry locations.	Fibrous or lead	0-3000	W-C	None
	Lead	3001-5000	W-C	None
	Fibrous	5001-5000	W-B	None
	Fibrous or lead	5001 and over	W-B	None
(ii) For general service designed for use in wet locations	Lead or impervious sheath	0-3000	W-C	None
	Lead or impervious sheath	3001 and over	W-B	None
	Fibrous[1]	All Voltages	W-A	None
(iii) For special service wire and cable designed for:	Fibrous or lead	0-600	W-A	None
(aa) Copper temperatures above 60° C. (bb) Motor leads. (cc) Severe mechanical conditions. (dd) High frequency communications. (ee) Railway signal service.	Fibrous, lead or impervious sheath.	All voltages	W-A	None
(iv) Designed for portable heavy duty service of the following kinds only: (aa) Electric power shovels and dredges. *(bb) Mining locomotives and machinery. *(cc) Welding machinery and power leads. (dd) Portable drills and tools. (ee) Electrically driven construction machinery, including air compressors, cement mixers, conveyers, hoists, cranes, locomotives and public conveyances. (ff) Oil well exploration cable. (gg) Shot fire cable, for use in gaseous mines as required by the U. S. Bureau of Mines.		0-5000	W-B	W-D
(v) Portable appliance service cords	Fibrous[2]	0-600	W-C	None
(vi) Automotive ignition cable	Fibrous	All voltages	W-B	None

[1]Except that W-B compound may be used in the insulation of lead covered underground distributing telephone cables.

[2]Provided that a compound containing not more than 50% by volume of rubber hydrocarbon (RHC) obtained by the use of reclaimed rubber only, may be used as a jacket in the manufacture of PWP type cord.

*For "Uni-insulation" the use of (W-A) compound is permitted in (ii) and (iii).

OHIO

Goodrich Activities

The B. F. Goodrich Co., Akron, has created a chemical and pigments department of the purchasing division with V. E. Wellman manager, according to A. D. Moss, director of purchases. The new department will be responsible for developing new sources of these materials and procuring them for both the chemical products and rubber manufacturing divisions of the company. Dr. Wellman joined Goodrich in 1929, worked on many projects in the chemical research department, and was made manager of the chemical laboratories in 1939. Two years later he became special technical assistant to T. G. Graham, vice president in charge of manufacturing operations.

John L. Collyer, president, presented 40-year service pins to Vernon Johnson, hose department; George Smith, engineering department; Thomas Guenther, hose and matting department; and Paul Sears, real estate and insurance department, at the recent sixteenth semi-annual pin presentation of the Twenty Year Service Club. The ceremony also honored 33 persons employed by the company for 30 years and 281 others who have completed 20 years' employment.

Rubber Research Sponsored at Cornell

Emphasizing that "America's critical rubber problem today can be met only with all-out conservation of the rubber now in use," Mr. Collyer recently announced that his company is providing financial aid to Cornell University, Ithaca, N. Y., in seeking a long-term solution to the problem through possible new botanical sources of rubber in the western hemisphere. A leading American producer of synthetic rubber will also provide technical assistance, he said.

Mr. Collyer stated that approximately 1,000 plants are known to contain rubber, in addition to studies of such vegetation which produces rubber, efforts will be made to find other plants which may also bear rubber. Attention will be given to increasing the yield of the guayule bush, he explained, although it has long been known as a rubber producer and his company has used guayule for more than 30 years.

Some of the leading scientists of Cornell who will direct the rubber study include Professors Lewis Knudsen, Lawrence H. MacDaniels, Richard Bradfield, Paul F. Sharp, and Carl E. F. Guterman. William C. Geer, former Goodrich vice president and director, has made available the facilities of his Ithaca laboratory. The committee will also have the aid of Liberty Hyde Bailey, noted horticulturist and plant collector.

"Historic" Scrap Rubber

Probably the oldest rubber article received in the national scrap rubber drive arrived at Goodrich, a railroad car shock absorber made in 1872. Two parts of the 70-year old product, which Goodrich technicians say can be reclaimed, were forwarded by William E. Daywalt, of Tiffin, O., whose father salvaged them from a railroad wreck near Tiffin, 60 years ago. The date the shock unit was manufactured is clearly branded in the rubber, and company reclaimers say it is the oldest rubber product they have ever seen which has reclaim value.

Firestone Tire & Rubber Co., Akron, is continuing the work begun by the late Thomas A. Edison on the development of rubber-bearing plants, as the goldenrod.

NBC's "Voice of Firestone" series, one of the oldest on the air, is the latest to be added to the network's shortwave schedules for America's overseas fighting men. The Firestone Company sponsors the broadcasts for 52 weeks, beginning July 21, over NBC's station WRC and WNBI and the Westinghouse station WBOS. The Firestone musical series is transmitted from transcription of the regular Monday night domestic broadcast. It is heard over the NBC shortwave network Tuesdays at 11:00 a.m. (EWT). Featuring soprano Margaret Speaks and tenor Richard Crooks, the Firestone series is one of 19 NBC domestic commercial shows currently being shortwaved overseas.

Seiberling Rubber Co., Akron, has formed a new subsidiary, Seiberling Metal Products Co. at Wooster, where machinery and equipment are being installed. Production will begin in several months. Officers of the new concern are: president, J. P. Seiberling; vice president, T. K. Seiberling; secretary-treasurer, J. W. Dessecker; board, J. P. and T. K. Seiberling and C. E. Jones.

Goodyear Tire & Rubber Co., Akron, last month appointed Otto L. Beiswenger manager of the engineering staff in the company's widespread enterprises, succeeding Henry G. Schmidt, resigned. After graduating from the Milwaukee School of Engineering in 1916, Mr. Beiswenger joined Goodyear and served, successively, as chief switchboard operator, electrical engineer, chief engineer of Plant 2, and manager of the power division. He has also had part in the design of the power plants built by the company in many of its world-flung factories. During the past year Mr. Beiswenger has been working principally on the construction of synthetic rubber plants, and he is a member of the Engineering Advisory Committee on synthetic rubber.

Problems applying specifically to chemical and food industry equipment were discussed at a meeting of purchasing and operating officials of chemical and food companies called by Goodyear conservation experts. The meeting, one of several scheduled for various cities in the United States in an effort to extend the life of vital industrial rubber equipment, was held July 8 at the Downtown Athletic Club, New York, N. Y. Speakers for the Goodyear company were H. J. Mackin, district manager, New York division; N. E. Kimball, manager of tank lining sales; and R. Claussen, synthetic rubber expert, mechanical goods development department. The gathering was shown a film depicting methods of combating unnecessary wear on rubber.

K. C. Zonsius, manager of the auto tire division of the tire department; Fred W. Climer, personnel director; and George K. Hinshaw, vice president and factory manager of foreign operations, were recently awarded Goodyear 25-year service pins.

NEW ENGLAND

R. I. Club Meeting

The Rhode Island Rubber Club held a dinner-meeting at 8:00 p. m. June 26 at the Metacomet Golf Club, East Providence, when the 78 in attendance heard Col. George R. Thompson discuss chemical warfare. Door prizes were awarded holders of lucky numbers.

In the afternoon golf was played. Prize winners were Ed. Collegan (Plymouth Rubber Co., Inc.), low gross; and E. W. Varnum (Quabaug Rubber Co.) and Leonard Yates (Industrial Paper & Cordage Co.), kickers handicap.

The generosity of the following concerns made all the prizes possible: Akron Standard Mold Co., Binney T. Smith Co., Continental Carbon Co., William D. Egleston Co., Ernest Jacoby & Co., H. Muehlstein & Co., Inc., Naugatuck Chemical Division of United States Rubber Co., New Jersey Zinc Co., Pequanoc Rubber Co., A. Schulman, Inc., R. T. Vanderbilt Co., Inc., L. G. Whittemore, Inc.

Bristol Mfg. Corp., manufacturer of "Bristolite" fabric and waterproof footwear, Bristol, R. I., is erecting a new one-story plant on Buttonwood St., to be of tile construction 230 by 290 feet. The site contains approximately nine acres, leaving room for expansion, and the company, according to President Maurice C. Smith, Jr., expects to move in within three months. Bristol Mfg. at present is a tenant in one of the buildings owned by the United States Rubber Co., which now, however, must reoccupy the plant to meet its own schedules.

Anaconda Wire & Cable Co. has made William H. Morley, general manager of its Pawtucket, R. I., plant, assistant general manager of Anaconda, with headquarters at Hastings-on-the-Hudson, N. Y. In consequence, on July 9, a farewell party was given Mr. Morley at the Pawtucket Golf Club, with more than 100 guests present. Mr. Morley, who has been with the Pawtucket plant for the past 11 years, received a handsome silver service.

Rhode Island rubber manufacturers in June paid out $300,601 in wages, 3.1% above the May figure, but 32.4% under that for June, 1941.

The Bristol Co., Waterbury, Conn., has appointed Charles A. Mabey director of research activities. He has served as physicist for several years in the organization and had been associated in research work with several other companies.

EASTERN AND SOUTHERN

U. S. Rubber Changes

United States Rubber Co., 1230 Sixth Ave., New York, N. Y., has appointed Fred S. Carpenter, formerly production manager of the tire division, general manager of the division and Howard N. Hawkes, recently made general sales manager, assistant general manager in charge of sales activities.

Also announced were the following appointments in the tire division organization. Harmon F. Newell, formerly sales and production coordination manager, will be in charge of tire division policies. J. E. Cady will remain as factory manager of the Indianapolis plant, C. E. Maynard as factory manager of the Fisk division plant at Chicopee Falls, Mass., and C. L. Remy as factory manager at Los Angeles. G. R. McNear, formerly in the New York offices, becomes factory manager at the Detroit plant, replacing C. L. Moody, to become factory manager of a Canadian plant. R. Y. Copland, formerly manager of this plant, now is production manager of the division, with offices in New York. Replacing S. P. Thacher, now in government service and formerly manager of the field engineering and service department, is W. C. Manville, who has been in that department many years.

Arnold F. Van Pelt, formerly assistant general manager of the tire division, has been put at the head of the newly created department of business research, which will study and evaluate new developments in the expanding fields served by the company and handle post-war planning activities.

U. S. Rubber has granted indefinite leaves of absence to Fred C. Tucker and R. E. Larson, field representatives of the tire engineering and service departments, who have been made chief tire inspectors for the Army Quartermaster Corps and will also direct work on the Army's tire conservation program.

The General Cable Corp., 420 Lexington Ave., New York, N. Y., has appointed G. W. Cassell, former rubber mill superintendent at the Perth Amboy, N. J., plant, plant manager of the Buffalo, N. Y., plant. J. T. Dugall has been promoted from assistant superintendent at Perth Amboy to production superintendent in charge of the rubber mill.

Pierce-Roberts Rubber Co., Trenton, N. J., has been operating at 75% capacity, mostly all defense work. Treasurer Clifford A. Pierce is spending the season with his family at their summer home on Cape Cod, Mass.

Clinton H. Crane, president, St. Joseph Lead Co., 250 Park Ave., New York, N. Y., recently received an honorary degree of doctor of engineering from the Missouri School of Mines and Metallurgy. Stevens Institute of Technology recently conferred an honorary degree of mechanical engineer upon **George F. Wheaton,** manager of the company's Josephtown, Pa., plant.

Mixing Equipment Co., Inc., 1029 Garson Ave., Rochester, N. Y., has appointed Robert E. Mason, of Charlotte, N. C., a representative in North and South Carolina, handling the line of "Lightnin" propeller and turbine mixers. Mr. Mason, a graduate in electrical engineering from the University of North Carolina, is a veteran of more than ten years in sales engineering in the electrical and process equipment field.

United Carbon Co., Inc., Charleston, W. Va., has available a four-page "Memorandum Regarding Synthetic Rubbers, Their Applications, and Types of Carbon Black Required" containing basic test and other data. The material, prepared by the research department of the company, is in the form of brief questions and answers.

L. Albert & Son, dealer in rubber mill machinery, is operating 100% capacity on defense orders at its four plants at Trenton, N. J., Los Angeles, Calif., Akron, O., and Stoughton, Mass.

Rainbow Rubber Co., manufacturer of rubber soles and household appliances, Butler, Pa., has retired from business because of the rubber shortage. On July 28 a public auction sale of the entire plant was held under the auspices of Industrial Plants Corp., 90 West Broadway, New York.

Martindell Molding Co., Ewing Township, Trenton, N. J., will erect a 20- by 60-foot two-story brick addition to the main plant. The company is operating three shifts seven days a week.

Associated Rubber Products Co. on July 1 moved its New York office to 1219 Springfield Ave., Irvington, N. J.

Luzerne Rubber Co., Trenton, N. J., manufacturer of hard rubber products, has been compelled to lay off help because of declining business.

Crescent Insulated Wire & Cable Co., Trenton, N. J., reports a substantial increase in business after securing more copper and rubber for insulation purposes.

National Association of Manufacturers, 14 W. 49th St., New York, N. Y., met on June 26 at the Waldorf-Astoria Hotel, New York, when the committee on post-war problems presented to the directorate a post-war plan for government and industry. Among those on the committee are: F. N. Bard, proprietor, Barco Mfg. Co., Chicago, Ill.; J. H. Ramsay, vice president, John Royle & Sons, Paterson, N. J.; C. D. Garretson, president, Electric Hose & Rubber Co., Wilmington, Del.; and E. E. Lincoln, economist, E. I. du Pont de Nemours & Co., Inc., Wilmington.

Puritan Rubber Co., Trenton, N. J., has branched out in the manufacture of soles and heels for the government, for which the company transferred to the plant special machinery from its other factories.

Butyl Rubber Estimates Increased

W. S. Farish, president, Standard Oil Co. (N. J.), 30 Rockefeller Plaza, New York, N. Y., announced at a press conference July 23 that a series of improvements in the Butyl rubber manufacturing process has raised the capacity of five plants under construction for the government from an original designed capacity of 60,000 tons a year to 192,000 tons a year at an estimated additional investment of 27%.

The program, as approved in principle by the WPB, now calls for cancellation of one of the five plants and the use of the materials and money saved thereby to increase the capacity of the four other plants to 132,000 tons a year. The isobutylene preparation capacity has been raised from 60,000 to 90,000 tons a year at no net increase in cost or increased use of construction materials as nearly as can be estimated. The additional 42,000 tons of isobutylene required for the increased butyl output can be obtained, it is believed, without appreciable expense from other plants now being built.

The original Butyl process cooled the raw materials to —150° F., and by use of a catalyst obtained a 20% conversion to the solid polymer. Consequently recirculation of the remaining 80% of the raw materials was required as well as considerable time and size of installation and compressor capacity to obtain a ton of Butyl rubber. By the improved technique, which involves the use of carbon black introduced into the raw material stream (isobutylene and butadiene) and other rather highly technical modifications, three tons of Butyl rubber might be obtained in the same time. A reduction in the cost of Butyl rubber of 5¢ a pound is anticipated.

Shows Movies on Rubber

At the request of several members of the press the color movie, "Bouncing Molecules", was shown at the Preview Theatre at 1600 Broadway, New York, on July 27 to aid in providing a basic background in reporting happenings in rubber chemistry. This movie, which employed Tinkertoy models for representation of the various chemical substances used and also for showing the changes that took place as the various substances were transformed into synthetic rubber raw materials such as butadiene and then the final long-chain polymer, gave an interesting and educational survey of the processes. Rubber mixing and testing procedures were also shown. In addition another movie entitled "Rubber Goes Synthetic" was exhibited.

H. I. Cramer, of Sharples Chemicals, Inc., Philadelphia, Pa., on July 15 presented a lecture on synthetic rubber at Harvard University, Cambridge, Mass., under the joint auspices of the Harvard Summer School and of the Boston & Cambridge Branch of the American Association of Scientific Workers.

The Neville Co., manufacturer of coal-tar products, Neville Island, Pittsburgh, Pa., according to Sales Manager L. V. Dauler, has changed the name of X-159 Rubber Reclaiming Oil to X-443 Rubber Reclaiming Oil.

OBITUARY

Effingham S. Finch

EFFINGHAM S. FINCH, assistant secretary of Binney & Smith Co., 41 E. 42nd St., New York, N. Y., from 1930 until he retired in 1939 because of poor health, died at his home in Rutherford, N. J., June 23, after a lengthy illness. Mr. Finch, who was born in Brooklyn, N. Y., March 12, 1881, joined Binney & Smith in 1906 as an order clerk and in 1917 was appointed credit manager. This department was headed by him until he retired.

He was a trustee of the Stationers & Publishers Board of Trade and a member of the New York Credit Men's Association, the National Association of Credit Men, and the Uptown Club, all of New York.

Survivors include his wife, a daughter, two sisters, and a brother.

Henry T. Sheckler

HENRY T. SHECKLER, 35, assistant to the automotive replacement division sales manager of the Thermoid Co., died suddenly at his desk of a heart attack on June 22. He had been with the company several years and was well known in golfing circles. Burial was at Catasauqua, Pa.

Newell B. Parsons

A HEMORRHAGE and toxic poisoning caused the death on July 15 of Newell Barnard Parsons, vice president and director of the Belden Mfg. Co., Chicago, Ill. Previous to joining Belden on November 9, 1904, as salesman he had been a telegraph messenger.

Mr. Parsons was born in Saginaw, Mich., on March 19, 1870, and attended both grammar and high schools.

He was a member of the Moslem Temple; Trinity Commandery, K. T., and the Chicago Athletic Association.

Funeral services were held on July 17 at the Emmanuel Episcopal Church, La Grange, followed by private interment.

Surviving are his wife, two daughters, and a son.

Sherman B. Ward

AFTER a brief illness Sherman Broomhead Ward, president of Stowe-Woodward, Inc., Newton Upper Falls, Mass., died in Boston on July 3. He had joined the rubber company in 1916 as treasurer and was elected president in June, 1932.

Mr. Ward was born in Portsmouth, N. H., January 30, 1890. He was graduated from The Phillips Exeter Academy in 1909 and from Dartmouth College in 1913.

The deceased belonged to the Woodland Golf Club, Engineers Club of Boston, Brae Burn Country Club, Dartmouth Club of New York, and the Masonic organizations.

Funeral services were held in Boston, July 5, with private interment in Wilton, N. H., the same day.

Survivors are the widow and a brother.

William Fitzgerald

AFTER a short illness William Fitzgerald, a close friend of the late Harvey Firestone, Sr., died at his home at Oak Park, Ill., July 20. Mr. Fitzgerald was born July 17, 1875, in Chicago, Ill., and after graduating from local grade schools enrolled for a general business course.

The deceased joined the Firestone Tire & Rubber Co. January 1, 1911, following employment at the Pullman Co., and was sent to the sales organization at St. Louis, Mo. Then on September 1, 1911, Mr. Fitzgerald was returned to Chicago in a sales capacity and made Chicago branch manager in July, 1918. On January 1, 1922, he was put in the company's manufacturers sales department and continued his association with the Chicago Firestone district office in a sales capacity until his death.

Funeral services were held in Chicago. Burial took place in Oak Park on July 23.

Mr. Fitzgerald leaves his wife, a daughter, and two sons.

MIDWEST

Monsanto Personnel Transfers

Monsanto Chemical Co., St. Louis, Mo., has transferred several key men in research and operating departments to its new Texas plant, according to Vice President Osborne Bezanson, general manager of the Texas Division. Herman K. Eckert, plant manager of the Nitro, W. Va., plant, has been made plant manager; and Charles S. Comstock, of the production staff of the Merrimac Division at Everett, Mass., has been named production superintendent.

R. L. Sibley, according to John W. Livingston, vice president and general manager of Monsanto's organic chemicals division, has been made general manager of manufacturing in charge of all production and research activities at Nitro, W. Va. He had been director of research of the Rubber Service Department of the division. His successor is David J. Beaver, assistant research director at the Nitro laboratories. Harry A. Merkle, production superintendent of the Nitro plant, was made plant manager, succeeding Mr. Eckert.

R. L. Sibley

Mr. Livingston later resigned as a vice president and a director of Monsanto to become a consulting engineer for Rubber Reserve Co., Washington, D. C., Julius A. Berninghaus, general manager of sales of the organic chemicals division, then was made general manager of the division to succeed Mr. Livingston. He has been with Monsanto since 1926, mostly in a sales executive capacity.

Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago, Ill., recently announced that contrary to current reports that petroleum companies, wishing to monopolize the manufacture of synthetic rubber, oppose its manufacture from alcohol, the petroleum industry actually favors any method which will make rubber in this country. It is to the definite interest of petroleum companies to have civilian cars running, and rubber is essential for this purpose, no matter what its source.

Thirty-seven rubber firms in the Midwest recently paid 17,685 employes $598,000 in wages, declines of 3.9% and 6.9%, respectively, over the previous month.

CANADA

Additional Rubber Restrictions

An order issued by Motor Vehicles Controller J. H. Berry stops the manufacture of such articles as bumper guards, rubber covers for clutch and brake pedals, rubber floor mats, etc., made of rubber. Heaters, defrosters, and "other parts required by law will still be made."

The use of rubber in some of the protective footwear supplied to the Canadian fighting services is to be discontinued because of the shortage; leather is to be substituted.

No new farm equipment will be supplied with rubber tires for the duration.

The Wartime Prices and Trade Board, Ottawa, Ont., has eased the restrictions applying to the advertising and display of rubber goods as issued April 2, 1942. As the sale of rubber tires and tubes is permitted to certain persons only, it has been decided to permit dealers to advertise and display them. Shoes with rubber heels may be displayed and advertised provided that the rubber heel is not featured. Retailers may still continue to display and advertise rubber products on counters and inside showcases in their stores.

The Munitions and Supply Department, Ottawa, has released new instructions to all tire dealers in order to speed up complete utilization of scrap rubber. Scrap

dealers who peel the tread off used tires cannot apply it to other used tires, but must turn it over to reclaim or rubber manufacturers or Fairmont Co., Ltd., the government-owned company which sells its scrap rubber to such manufacturers. To assist in conserving rubber, dealers must no longer leave used tires or tubes lying around their premises. Wherever a tire or tube can be made safe for regular service on a vehicle, it must be reconditioned and offered for sale by a dealer. Should it prove unfit for automobile use, it may be employed as repair material, outside of the tread peel, for other tires or tubes. All scrap, however, must be sold promptly to manufacturers for conversion into reclaim rubber.

Frank Dowsett, director of publicity, Gutta Percha & Rubber, Ltd., Toronto, Ont., has been elected a director of the Canadian Circulations Audit Board.

Dominion Rubber Co., Ltd., Montreal, P. Q., has appointed George B. Rutherford general manager, mechanical and sundries division, Montreal, and J. A. Porteous assistant general sales manager. Formerly Mr. Rutherford had been general sales manager of the special products division and in his new appointment will have control of both sales and manufacturing activities of the mechanical and sundries division. Mr. Porteous lately had been manager of the molded goods division.

R. W. Richards, general sales manager, Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., recently addressed a luncheon meeting of the Sales Research Club, Toronto, on "How to Sell without Cars."

The Viceroy Mfg. Co., Ltd., Toronto, Ont., is now producing "War Grade Jar Rings" made from a new formula compounded to contain a minimum amount of rubber and other essential war materials.

The B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., is now offering a complete line of leather mitts and gloves under the brand "Rhino." The company has also gone back into the work boot business which it dropped a few years ago.

E. J. Hayes, Gutta Percha & Rubber, Ltd., Toronto, Ont., recently was elected secretary of the Industrial Advertisers Association of Ontario.

Pomona Pump Co., Pomona, Calif., has elected as treasurer C. Granniss Bonner, formerly treasurer of The Brunswick-Balke-Collender Co., Chicago, Ill. Mr. Bonner relieves Donald C. McKenna, Pomona's vice president and former treasurer, who will devote full time to the increasing production activities of the company's four manufacturing plants.

Homer E. Ludwick, controller of the Firestone Tire & Rubber Co., Los Angeles, Calif., has been elected president of the Los Angeles Control of the Controllers Institute of America. One E. 42nd St., New York, N. Y.

FROM OUR COLUMNS

50 Years Ago—August, 1892

The Treasury Department reports that the amount of rubber imported from Honduras by the United States during the last fiscal year at 273,505 pounds valued at $117,170. (p. 329)

Taking rubber covered wires manufactured through the United States, the average proportion of Para rubber to the compound may be stated as about 30%, which, considering the fact that rubber is able to absorb such quantities of compound, is a fine showing. (p. 337)

It has lately been found that the smoothness of surface in the interior of rubber-lined hose is of importance. The friction of water is greater with some kinds of rubber, as it is also with a roughly manufactured inner surface. The subject has been considered of such importance that manufacturers who have not paid much attention to the subject before are modifying their methods to obviate the objections, especially as they relate to fire hose. (p. 346)

25 Years Ago—August, 1917

It is evident, from what has been needed in the treatment and care of the wounded of the Entente Allies, that we shall have to provide enormous quantities of rubber surgical goods available on the other side of the Atlantic and likewise very large supplies ready for our fighting fleet. (p. 638)

An important question at the present time is whether solid or pneumatic tires are better for army trucks in the severe service which is required of them under war conditions. A practical test was recently made by the United States Tire Co., New York, N. Y., which certainly shows that the pneumatic tires are efficient and will stand service under the most difficult conditions. The test seems to prove that pneumatics have some advantages over solid tires for trucks in heavy service. (p. 644)

Chemical analysis is not sufficient alone for judgment of the rubber quality. Properties of rubber are chiefly determined by the physical nature of rubber and the rubber molecule. The quantitative chemical differences are not enough to account for the large differences found in the physical properties; in general a high viscosity indicates good mechanical properties of the rubber after vulcanization. (p. 649)

The Master Car Builders' Association specifications for air brake and signal brake base prescribe standard methods of test and maximum and minimum test requirements as follows: Friction. The quality of friction rubber must be such that a 20-pound weight will not separate the duck plies of a one-inch wide section of hose more than 8 inches in 10 minutes. (p. 650)

FINANCIAL

Baldwin Locomotive Works, Philadelphia, Pa., and wholly owned subsidiaries. Year ended June 30: consolidated net profit, $4,463,145, equal, after preferred dividend requirements, to $4.18 each on 1,028,234 common shares, compared with $1,393,882, or $1.20 a common share, in the year ended June 30, 1941; provision for taxes, $9,037,250, against $294,043.

Firestone Tire & Rubber Co., Akron, O., and subsidiaries. Six months ended April 30, 1942: net profit, $5,193,024, equal, after preferred dividend requirements to $1.97 each on outstanding common shares, compared with $4,789,165, or $1.75 a common share, in the half year ended April 30, 1941.

Norwalk Tire & Rubber Co., Norwalk, Conn. Six months to March 31: net profit, after $85,902 provision for federal income and excess-profits taxes and $60,000 for contingencies, $64,293, equal to $7.32 each on 8,784 shares of 7% cumulative preferred stock, on which dividend arrears total $3.93 a share; after allowing for six months' dividend requirements on preferred stock, balance was equal to 24¢ each on 202,230 common shares; contrasted with a net loss of $16,769; net sales, in the six months ended March 31, 1942, $1,956,248, against $1,321,289.

General Electric Co., Schenectady, N. Y. First half, 1942: net profit, $20,681,433, equal to 72¢ each on 28,845,927 common shares, against $26,003,665, or 90¢ a share, in the first half last year; net sales, $412,383,825, against $300,332,085; orders received, $865,372,069, against $521,138,605.

General Tire & Rubber Co., Akron, O., and subsidiaries. Six months to May 31: net profit, after $650,000 for Federal income and excess profits taxes, $642,210, equal, after preferred dividend requirements, to $1.09 each on 527,147 common shares, against net profit in 1941 period of $1,004,443, after $850,000 tax charges, equal to $1.77 a share on 526,847 common shares then outstanding; net sales, $13,591,741, against $16,391,801.

Hercules Powder Co., Wilmington, Del. First half, net earnings, $2,195,130, equal after preferred dividend requirements, to $1.47 each on 1,316,710 common shares outstanding, contrasted with $2,831,189, or $1.95 a common share, in the first six months last year; net sales, $56,568,982, against $34,858,700; provision for federal taxes, $11,907,836, against $4,715,742.

Sun Oil Co., Philadelphia, Pa., and subsidiaries. Six months to June 30: net profit, $3,677,091, equal, after preferred dividend requirements, to $1.22 each on 2,837,971 common shares, against $5,168,431, or $1.90 on 2,580,898 common shares in first half of 1941.

EUROPE

SOVIET RUSSIA

Reconstructing Worn Tires

The shortage of products in Russia even before the war broke out made it imperative to utilize fully all goods. Occasionally some rough and ready methods of conservation were tried by individuals, and if they did not always work very well, they at least had the advantage of being simple, quick, and requiring little or no valuable material. Thus about four years ago someone got the idea of reconstructing tires which it would not pay to have retreaded or repaired in the usual way; the worst parts of two tires were cut off from the beads without severing the latter, and then the salvaged halves were put together with cement so as to form a single tire, but having four beads instead of two. The results left much to be desired, mainly because the work was done carelessly and without any system. However the Leningrad Tire Repair Trust thought the method had possibilities and worked on it.

The process subsequently developed is intended for tires which have large tears or holes right through the tread or carcass, but in which there is no separation of plies, the cords are not badly worn, and at least 60% of the tire circumference is in good, usable condition. It is particularly applicable to tires out of which pieces or "windows" have been cut in the factory for testing purposes. Two tires of the same size and design are selected whose usable parts are in approximately the same condition. They are placed on top of each other, and cutting lines marked to allow 12 to 15 centimeters at each end of each useful half for beveling purposes. The parts to be discarded are then cut off from the beads, which are kept intact.

The edges must be beveled with precision; care must be taken to cut the bevels on one tire half with an outward slope, and on the other half with an inward slope, and equal care and precision are later on required in interlacing the beads and putting the parts together to insure that the finished tire has the exact required inside diameter. When the finished tire is mounted on the wheel, the beads of the half with the outward bevels come to lie uppermost between the beads of the half with the inward bevel and the locking rim of the wheel.

Before the parts are put together, the beveled surfaces of the tire halves are roughened and coated with cement; the bead edges undergo no further treatment. The halves can now be carefully put together; next the joints are covered on the inside with strips of repair material not heavier than four-ply and not longer than 25 centimeters, so as to prevent the entry of foreign objects and also to cover any roughnesses that could damage the inner tube. Finally the joints are vulcanized in the usual manner with the aid of molds and air-bag.

Two tires rebuilt in this way at the Leningrad Tire Repair factory were tested in May, 1939, first being mounted on the rear wheels of an automobile, where they ran for 1,500 kilometers and then changed over to the front where at the time of the report (about three months later) they were still giving good service after having run an additional 1,500 kilometers. Another report states that an extra 8,500 kilometers were obtained from tires similarly reconstructed by the Smolensk Tire Repair factory.

It is claimed that riding on these tires is perfectly normal in every way, and while the difficulty of mounting the tires, even on the older type of wheels, is admitted, it is considered that the various advantages, as comparative simplicity of process, saving in repair material, and considerably higher mileage obtainable as compared with other methods of repairing tires in the condition described, make the system well worth adopting.

Sunflowers and *Vatochnik* for Rubber

In their more recent efforts to find suitable domestic rubber-bearing plants Russian investigators seem to be following a new tack—they are searching for those which yield other useful products besides rubber, whose every part has commercial possibilities.

On this basis sunflowers and *Asclepias cornuti*, or *Vatochnik* as the Russians call it, are considered worthy of special attention.

Various kinds of sunflowers, some of enormous size, have for long been cultivated in Russia for their seeds from which is expressed a good edible oil (resembling hemp and poppy-seed oil in its chemical composition), that is also used in soap-making; while the residue serves as feed for cattle. The seeds are also eaten like nuts. It has now been found that the leaves and stems not only yield a useful fiber, but also rubber and resin of what is said to be exceptional quality. The resin has a pleasing aromatic odor and suggests commercial possibilities in various fields. Different varieties of sunflower contain varying amounts of rubber and resin. Thus the leaves of some selected varieties of annuals raised at Saratov for oil contain 1.40 to 5.75% of rubber and 4.3 to 7.7% resin. According to yield capacity, they are classed with *Vatochnik*, *Kendyr*, and *Chondrilla*, that is with the third group of rubber-bearing plants in Russia. The rubber from these plants, it may be added, is used for mixing with synthetic rubber, in the lacquer industry, in producing adhesives, and for special products like ebonite, oilcloth, etc.

It is calculated that in a stand of 50,000 plants per hectare, certain selected types of annual sunflowers would yield from 127.7 to 189.5 kilograms of rubber and 271.5 to 367.8 kilograms resin, dry weight, per hectare.

Besides the annuals, there are 15 to 20 types of perennial sunflowers which not only are valuable oil producers, but contain rubber in amounts sufficient to class them with *Teke-sagyz*, guayule, and *eukomia*, or with the second group of rubber-bearing plants. The first group, incidentally, includes *tau-sagyz*, *kok-sagyz*, and *krim-sagyz*.

Most of the perennials yield from 25.5 to 35.5% oil and contain also 2.66 to 9.56% rubber and 8.8 to 13.3% resin. Requiring no special care or treatment, they produce large masses of green stuff every year for ten years and more; some types, like *Helianthus occidentalis*, *H. grosse-serratus*, *H. giganteus*, *H. Maximiliani*, and others, give two or even three crops of leaves a year. The accumulation of rubber in the leaves seems to vary with the growing conditions of the plants; at Saratov it has been observed that maximum yields of rubber are obtainable from the leaves in the middle stories of the plant and at the end of August. It is believed that both rubber and resin content could be considerably increased by suitable methods of cultivation. So far, under the most favorable conditions, the yields of various types of sunflowers have been up to 5.24%, but *H. strumosus*—which is also a high-grade oil-yielding type—has given as much as 9.56%.

Asclepias cornuti, a native of Canada, is receiving attention because not only is rubber obtainable from the leaves, but the seeds yield 17% of oil from which can be prepared a liquid soap for the textile industry, and hard fats (by hydrogenization); while it also

serves as a siccative. The down from the plant would be of use in the munitions industry, and the stems in the paper industry or for fuel.

Vatochnik is a perennial plant which may attain a height of 3.5 meters; while the diameter of the stem is 1.5 to two centimeters. Although it has been grown in various parts of Russia, it seems to flourish best in the more southern regions, in a moist fertile soil, where there is adequate rainfall and no frost for at least six months of the year. Mature plants withstand dry conditions well enough, but young plants burn up under prolonged spells of dry weather. The plant must have regular care and a suitable fertilizer every year, when it will thrive in the same place for 10 to 15 years, yielding up to 20 tons of green stuff per hectare.

The rubber occurs chiefly in the leaves; the yield ranges from 1% to 6.5%, depending on age and general agricultural and climatic conditions. The amount of resin is slightly higher than this.

GREAT BRITAIN

F. B. R. A. M. A. Meeting

The new Federation of British Rubber & Allied Manufacturers' Associations held its first meeting May 21. In the meantime four more associations have joined: The British Producers' Association, Rubber Sports Goods Association, Screw Stopper Makers' Association, and Sole & Heel Manufacturers' Conference, to bring the total number of associations included in the Federation to 21.

At the meeting the following additional committees were appointed: Concentration, including Advisory Committee to the Board of Trade, Technical, Finance, Accountancy, Transport, Press, Raw Materials Allocation, and Operations.

The following officers were elected: chairman, L. V. Kenward; vice chairmen, R. H. Comley and A. Johnston; executive committee, T. H. Brooke, Scaly Clarke, J. Cunningham, A. W. Fletcher, H. Franklin, H. H. S. Hiller, H L. Kenwood, R. W. Lunn, Reginald Moseley, A. Ryan, and Allan Sinclair; director, H. J. Lloyd.

Many important matters concerning the rubber industry are now under discussion with government departments, and others will come up from time to time. As the departments cannot negotiate with individual firms on matters of common interest to a given industry, it is to the advantage of manufacturers to join associations through which they may express their views, and not only during the war period, but also afterward. For it is evident that controls will not be lifted for some time after peace is restored; while new trading conditions will undoubtedly follow. Thus it has been suggested that after the war free trade for all countries should be introduced; and if this takes place, some system of quotas will be necessary.

Care of Tennis Balls

Although considerable stocks of golf and tennis balls are still on hand, they will have to be handled with care since an order has gone out prohibiting their manufacture.

The research department at Fort Dunlop has suggested that the life of a tennis ball may be prolonged by washing it carefully in soap and water. The balls should be dry, and loose dirt removed by shaking them in a net before a fire. Each ball should be dipped several times into a bowl of soapy water; and the cloth covers should not become saturated. Then they should be lightly rubbed with a clean stiff nail brush; next all traces of soap should be removed, and finally the balls should be slowly dried in front of a fire.

Prices for African Rubbers

The Ministry of Supply has issued the following schedule of grades, types, and prices of African rubbers for contracts, made on or after June 15: Grade 1, first sheet, *Hevea, Funtumia, Ceara,* 1% adulteration, 1s.2d. per lb.; Grade A, second sheet, *H.F.C.,* 2% adulteration, 1s.1½d. per lb.; Grade A, third sheet, *H.F.C.,*

3% adulteration, 1s.1d. per lb.; Grade B, first quality crepe, 1s.1½d. per lb.; Grade B, second quality crepe, 1s.½d. per lb.; Grade C, miscellaneous wild rubber classified as biscuits, lumps, balls, niggers, cube, strips, root, Congo, first quality, 10% adulteration, 1s. per lb.; second quality, 20% adulteration, 10½d. per lb.; third quality, 30% adulteration, 9d. per lb.; fourth quality, 40% adulteration, 7½d. per lb.; all other qualities, including paste and flake, 7d. per lb. Prices are f.o.b., and the percentages of adulteration and moisture will be based on shipping weights.

The above prices show a fair increase over those offered some weeks earlier.

R. G. A. Election

At the ordinary general meeting of the Rubber Growers' Association, April 23, in London, Harold F. Copeman was elected chairman for the ensuing year and J. C. Innes, vice chairman. The following were elected to Council: A. C. Matthew, A. J. Austin-Dickson, R. Bannerman, N. C. S. Bosanquet, Geo. Brown, P. J. Burgess, N. G. English, James Fairbairn, R. B. Fidler, T. J. Carlyle Gifford, A. F. Goodrich, E. D. Hewan, J. W. M. Kennedy, G. H. Masefield, Sir George Maxwell, J. L. Milne, G. R. Muglistón, J. E. Nathan, H. R. Quartley, R. F. McNair-Scott, Charles Stewart.

New I. R. I. Officers

On May 6 the Institution of the Rubber Industry held its twentieth annual general meeting in London, with F. D. Ascoli chairman. Sir Walrond Sinclair was reelected president for the year 1942-43; while the following were elected vice presidents: F. D. Ascoli, T. B. Barlow, Sir George Beharrell, Sealy Clarke, Hugh C. Coles, Lord Colwyn, H. A. Daynes, Alexander Johnston, P. Kelly, Eric Macfadyen, H. Eric Miller, H. G. Montgomery, S. S. Pickles, Herbert Rogers, S. T. Rowe, P. Schidrowitz, D. F. Twiss, D. F. L. Zorn. The following were elected to form the Council for the coming year: C. H. Birkett, J. C. Burton, Ernest J. Coles, C. B. Copeman, J. Cunningham, J. Entwisle, R. N. Ferguson, G. A. Findlay, T. L. Garner, C. M. Hamilton, W. A. Hazlett, A. D. Ingram, Fordyce Jones, L. V. Kenward, F. G. W. King, E. C. Lacey, R. W. Lunn, C. T. Mabey, Geo. Martin, Reginald Moseley, E. A. Murphy, W. J. S. Naunton, F. M. Panzetta, A. Ryan, J. R. Scott, L. R. Ridgway, R. W. West, G. Stafford Whitby, J. Wilson, and Paul Worth.

Notes

The India Rubber Journal has moved from the premises temporarily occupied during the past year at Lennox House, Norfolk St., London, W.C.2, to more spacious quarters in Stafford House, corner Norfolk St. and the Strand. On May 10, 1941, the offices occupied by the journal for 41 years in Shoe Lane were totally destroyed during one of London's heaviest air raids.

Goodyear Tire & Rubber Co. (Great Britain), Ltd., reported net profits of £111,864 for 1941, against £161,800 for 1940. A dividend of 4½% was paid on preference shares, and total dividends of 10% (against 15%) on ordinary shares, after which £273,182 (against £276,818) were carried forward.

SWEDEN

Sweden also is looking for ways to alleviate the rubber shortage. Lately, stimulated by the work of the Russians with *kok-sagyz*, Sweden has been considering the possibility of cultivating this plant. A serious obstacle, however, is that large areas of fertile land are needed, and these lands are at present required for producing grain.

In the meantime Sweden is meeting the tire shortage by changing her transport system and is constructing an aerial system for moving iron ore from the mines to the smelters.

DENMARK

In Denmark work has been in progress on products as substitutes for natural rubber. Materials obtained by a process using coal and limestone seem to have given satisfactory results during experiments, but the cost is high. At present local manufacturers are mixing the natural crude rubber still available with German buna and are said to be obtaining products with excellent properties.

Other methods of overcoming the shortage of rubber are also being resorted to. A Danish merchant has patented an elastic metal band to take the place of rubber for hose supporters and underwear. The band, of metal springs about five millimeters wide, is claimed to be so soft and supple that it can be knotted like rubber elastic. The band is detachable and is said to preserve its elasticity indefinitely. Government tests, furthermore, have shown that perspiration and washing will not rust the metal wire used in the springs.

The good qualities of the new band have aroused considerable interest among hosiery firms here, and it is possible that the new article will survive into peacetime to become an important new industry.

Meanwhile two Copenhagen factories now making springs and slide fasteners will handle the product, and the government has authorized the importation of enough raw materials to insure production of 2,000,000 meters of this new band during the next six months.

FRANCE

Reports from France state that German authorities have been negotiating with French tire manufacturers to produce tires for German account. Confronted with the alternative of accepting Nazi orders or closing their plants, several leading producers are understood to have agreed to Nazi propositions. The raw materials, crude rubber and buna, will be supplied by Germany.

The price of rubber is said to have quadrupled.

The import duty on synthetic rubber has been suspended for nine months starting January 25, 1942. Three weeks earlier import duties on precipitated sulphur had been suspended for a similar period.

NETHERLANDS INDIA

At the general meeting of the Kediri Agricultural Association, November 29, 1941, probably the last before the Japanese invasion, P. J. S. Cramer spoke on clonal seedlings. He pointed to the growing popularity of this planting material, but did not discuss whether it was preferable to bud-grafts. However he emphasized that planters should bear in mind that in clonal seedlings they had a material to deal with that was entirely different from the old-fashioned seedlings and that they made special demands in the way of planting, upkeep, and exploitation. But experience in these directions was limited so that it was advisable for growers to plant small plots with clonal seedlings in order to study their behavior under different conditions and thus acquire the necessary knowledge as to the best methods of handling them.

Reports via the Dutch news agency, Aneta, state that three of the most important Dutch concerns operating in Netherlands India have been seized by the Germans and placed under the control of Nazi commissars. The corporations, which had combined resources of $100,000,000, are the Amsterdam Trading Co., the Deli Maatschappij, and the Deli Batavia Rubber Co., all of which were also interested in rubber, with the last two having plantations in Sumatra.

LATIN AMERICA

BRAZIL

President Vargas of Brazil has authorized the Minister of Finance to organize the Rubber Credit Bank (Banco de credito da Barracha) to aid all phases of the rubber industry and particularly the rubber gatherers who will be offered release from the "aviador" system. Capital of the bank will be 50,000 contos, 55% of which will be held by the Brazilian Federal Treasury, 40% by the Rubber Reserve Co. (United States), and 5% by other Brazilian interests. The Bank is empowered to give aid to producers, merchants, and all others connected with the rubber industry. It will provide capital also for sanitation projects in the rubber country.

It holds out real hope for the actual growers or gatherers who up to now have been under the outfitting merchant, "the aviador", under a system similar to that imposed upon the American share-cropper. The rubber gatherer will be able to buy an outfit on fair terms and sell his product in the open market instead of being forced to deliver his crop to one man. This plan, it is believed, will attract permanent workers to the rubber country.

MEXICO

A presidential decree lifting recent restrictions on the sale of tires and tubes in Mexico is taken as an indication that the rubber situation has definitely improved. The production of guayule rubber seems sufficient now to meet needs of local manufacturers, and special permits for the purchase of rubber goods are no longer required. Rubber manufacturers are reported working at full capacity.

The Mexico Hotels Tire Service has been set up in Mexico City and Monterrey to rent tires to American tourists while in Mexico. The plan, approved by the Secretaria de Economia, allows the company to purchase 750 tires annually for four years for rental purposes. The company in return is under obligation to create a rubber plantation sufficient to take care of the company's need of rubber by 1947.

The tourist leaves his own tires with the company while he drives through Mexico on rented tires. He may also have his own tires reconditioned during his trip. The charge is from 50 to 75 pesos per tire for reconditioning depending upon the size of the tire. Rental charges are: small cars, 2 Mexican centavos per kilometer per tire; medium cars, 2½ centavos per kilometer per tire; big cars, 3 centavos per kilometer per tire. The tourist, besides leaving his own tires, makes a deposit of 500 pesos for a small car, 625 pesos for a medium car, or 750 pesos for a big car. He is also obliged to buy coupons for 250 pesos per couple which are good for cash in payment of room and board in Mexican hotels.

LATIN AMERICA NOTES

Peru and the United States will start an agricultural experiment station to aid in developing quinine, rubber, and certain other important materials. The site is on the eastern slopes of the Andes Mountains, near the headwaters of the Amazon River.

Dutch Guiana shipments of balata in 1941 increased considerably over those for 1940. With crude rubber prices more attractive than they have been for a long time, it is expected that a certain amount of wild rubber will also be collected.

Editor's Book Table

BOOK REVIEWS

"Volumetric Analysis. Volume One, Theoretical Fundamentals." Second Revised Edition. I. M. Kolthoff and V. A. Stenger. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y. 1942. Cloth, 6 by 9¼ inches, 309 pages. Illustrated, author and subject index. Price $4.50.

The authors have thoroughly revised and enlarged earlier German and English editions of the text. Some condensation has been achieved to permit the addition of new material. The section on oxidation-reduction indicators has been greatly increased in scope and exposition. The chapter on "Volumetric Methods of Organic Analysis" has been extensively revised, and other chapters including "Catalysis and Induced Reactions" rewritten.

The fundamentals of volumetric analysis are reviewed in Chapter One. Definition of common terms and a classification of volumetric methods are given, and titration and the conditions necessary for satisfactory volumetric reactions discussed. Various catalytic processes which can be used with advantage to influence reactions as well as other types of induced reactions are clearly explained in Chapter Seven. Six of the more important volumetric methods for the determination of organic non-electrolytes based on molecular reactions and other physico-chemical foundations are summarized in Chapter Nine. These include saponification, reversible addition reactions, halogen addition compounds, formation of condensation products, substitution reactions, and oxidation and reduction reactions. In conclusion the volume describes analytical methods for the determination of the equivalence-point based on physico-chemical properties other than indicator action or light transmission such as conductometric, potentiometric and amperometric titrations and other less common methods. Several useful tables comprise an appendix.

A second volume concerned with practical aspects of the subject is scheduled for publication in 1943.

"Production Control." Lawrence L. Bethel, Walter L. Tann, Franklin S. Atwater, and Edward E. Rung. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. Cloth, 9¼ by 6 inches, 276 pages. Index. Price $2.75.

This text was written primarily for the use of classes in production control organized under the Engineering, Science, and Management Defense Training Program. The material is based on the results of a recent wide survey of Connecticut industries and the industrial and teaching experiences of the authors. The basic principles of production control and the varied systems and procedures necessitated by different types of industries are illustrated by many examples of current industrial practices. Chapter seven describes the routing of parts and products in the manufacture of rubber footwear. Complete sets of standard record and report forms employed in the control of production by Farrel-Birmingham Co., Inc., and sections of the manual, "Written Standard Practice", used by the footwear division of the United States Rubber Co. are reproduced in the appendix.

NEW PUBLICATIONS

"Effect of Milling on Plasticity of Neoprene Type CG and on Viscosity of a CG Cement." Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. June, 1942. 1 page. This data sheet gives the results of tests in terms of Williams' plasticity values and viscosities as determined on the Stormer viscosimeter for various milling times.

"Piccocizer "30," All-Purpose Plasticizer for Synthetics." Standard Chemical Co., Akron Savings & Loan Bldg., Akron, O. 8 pages. This pamphlet describes the properties of a recently developed plasticizer[1] for synthetic compounds and gives test data for a basic Hycar OR formula.

[1] For details see India Rubber World, July, 1942, p. 406.

"Monsanto Chemicals." Monsanto Chemical Co., 1700 South Second St., St. Louis, Mo. 1942. 170 pages. The twenty-sixth edition of this useful and informative trade catalog, designed to serve as a buying guide, contains chemical names, trade names, formulas, standard forms or grades, uses, specifications, general information, and the available special literature for several hundred chemicals. All products are listed alphabetically with generous cross-referencing, including the company's complete line of accelerators, antioxidants, and other rubber chemicals. A technical section gives tables of physical constants for some of the more common chemicals.

"Inspected Gas, Oil and Miscellaneous Appliances." Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. June, 1942. 22 pages. This supplement to the December, 1941, List contains reexamination service listings of electrically conductive shoes made with soles, heels, and sock linings of conductive rubber electrically connected together, and several types of synthetic rubber hose.

"Enlisted for the Victory." Bibb Mfg. Co., Macon, Ga. 24 pages. Illustrated. This folder describes textile products used in various war equipment. It includes a description of the properties of a heat-resistant bonded cotton fiber cord which is claimed to permit the use of less rubber in tires.

"Synthetic Rubber and the Rubber Outlook." The B. F. Goodrich Co., Akron, O. 20 pages. This booklet contains the testimony of John L. Collyer, president, The B. F. Goodrich Co., Akron, O., before the Senate Committee Investigating the National Defense Program. It outlines the technical and production aspects of his company's synthetic rubber output and offers suggestions for rubber conservation.

"Conservation of Critical Materials and Simplex Wires and Cables." Simplex Wire & Cable Co., Cambridge, Mass. 16 pages. June, 1942. This folder explains the restrictions of rubber and other critical materials which have curtailed the production of insulated wires and cables for non-essential uses.

"The Netherlands Indies and the United States." Rupert Emerson. World Peace Foundation, Boston, Mass. 1942. 92 pages. Price 50¢ (cloth); 25¢ (paper). In condensed form the author surveys the economic development including rubber production of the Netherland East Indies during the years immediately preceding the current war and discusses the interests of other nations in that Pacific area. He concludes that the United States cannot permit the islands to fall to the control of unfriendly nations and suggests that American requirements might well be satisfied after the war by a Dutch mandate operating under international guarantees.

"Green Book Buyers Directory." 1942-43 Edition. Schnell Publishing Co., Inc., 59 John St., New York, N. Y. 1144 pages. Keeping pace with the increase in the number and varieties of chemicals produced for industrial use, the thirtieth annual edition of this directory lists the sources of supply of a greater number of chemicals, oils, drugs, and related materials than has appeared in any previous issue of the Green Book. Names and addresses of manufacturers are listed under the name of materials, equipment, etc., which are in alphabetical order. The contents are divided into three sections: Part I, makers of industrial raw materials; Part II, makers of industrial equipment, containers, and other supplies; Part III, professional, technical, and commercial services. Manufacturers of ingredients and supplies for latex, natural and synthetic rubber compounding are included.

"List of Inspected Electrical Equipment." Underwriters' Laboratories, 207 E. Ohio St., Chicago, Ill. 1942. 492 pages. All listings up to May 1, 1942, are included in this compilation which replaces all similar lists, supplements, and bulletins. A classification of rubber-covered wires is given preceding the 32 listings in the label service.

"Synthetic Rubber: a Bibliography." Tulsa Public Library, Tulsa, Okla., May, 1942. 12 pages. This bibliography, compiled by the library's technical department, lists many general articles from a variety of publications and references to the literature on the various foreign and American types of synthetic rubber.

"Neoprene Inner Tubes." Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. July, 1942. 4 pages. These data sheets compare the physical properties of inner tubes made from neoprene with those of a heat-resistant rubber truck tube. Various changes in the neoprene recipe are suggested to obtain certain properties required by different conditions of service.

"Ward's Automotive Year Book. 1942." Ward's Reports, Inc., 516 Marquette Bldg., Detroit, Mich. 80 pages. Basic production, sales, and registration data concerning the United States automobile industry are given in the fifth annual edition of this yearbook. Among the statistical tables are the 1941 output and shipments of tubes and casings, United States crude rubber imports and stocks (1925-41), and the OPA potential rubber consumption forecast (1942-44).

"Victory in the Making." Standard Oil Co. (N. J.), 26 Broadway, New York, N. Y. 32 pages. **"Wheelco Measuring and Control Instruments."** Bulletin No. Z6000. Wheelco Instruments Co., Chicago, Ill., 16 pages. **"Stabilog Controller."** Bulletin A-330. The Foxboro Co., Foxboro, Mass. 16 pages. **"Standards in the War Effort."** Special issue of *Industrial Standardization and Commercial Standards Monthly*, June, 1942. American Standards Association, 29 W. 39th St., New York, N. Y. 52 pages. **"War-Time Protection for Batteries."** United States Rubber Co., 1230 Sixth Ave., New York, N. Y. 4 pages; **"Civilian Defense Index."** General Atlas Carbon Division of General Properties Co., Inc., 60 Wall St., New York, N. Y. 16 pages. Publications of the British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C.3., England: No. 16, **"Rubber, Polyisoprenes, and Allied Compounds.** I. The Synthesis of Low-Molecular Polyisoprenes of the Rubber and the Squalene Type", E. H. Farmer and D. A. Sutton, 8 pages; No. 20. **"The Interaction between Rubber and Liquids.** 1. A Thermodynamical Study of the System Rubber-Benzene". G. Gee and L. R. G. Treloar, 24 pages; No. 21. **"The Caoutchol Component of Natural Rubber: A Correction".** K. C. Roberts, 8 pages. **"Carrier Air Conditioning, Refrigeration, Heating."** Carrier Corp., Syracuse, N. Y. 12 pages: **"National Salvage Program."** Bureau of Industrial Conservation, War Production Board, Washington, D. C. 12 pages.

RUBBER BIBLIOGRAPHY

Rubber from the Russian Dandelion. E. W. Brandes, *Agriculture in the Americas*, July, 1942, pp. 127-31.

Rubber: Basis of Today's Warfare. R. W. Horton, *Foreign Commerce Weekly*, July 4, 1942, pp. 8, 41.

Tools for Natural Rubber Projects. *Foreign Commerce Weekly*, July 4, 1942, pp. 9, 43.

Why We Must Make More Synthetic Rubber. *Chem. & Met. Eng.*, June, 1942, pp. 76-77.

Synthetic Elastomers. S. J. French, *Scientific American*, July, 1942, pp. 10-13.

Critical Examination of Some Concepts in Rubber Chemistry. T. Midgley, Jr., *Ind. Eng. Chem.*, July, 1942, pp. 891-96.

Tires Should Not Roll Except on the Road to Victory. *Domestic Commerce*, June 25, 1942, pp. 15-16.

Our Rubber Situation. E. G. Holt, *Domestic Commerce*, June 25, 1942, pp. 22-24.

Tear Resistance of Rubber Compounds. I G. A. Patrikeev and A. I. Melnikov, *India Rubber J.*, May 30, 1942, pp. 9-12; II. June 6, pp. 8-10, 15.

Specific Dispersion of Pure Hydrocarbons. R. E. Thorpe and R. G. Larsen, *Ind. Eng. Chem.*, July, 1942, pp. 853-63.

Compounding with Reclaim. P. M. Elliott, *India Rubber J.*, June 20, 1942, pp. 3-4.

Dunlop Fatigue Test for Rubber Compounds. V. E. Gough and D. Parkinson, *India Rubber J.*, June 20, 1942, pp. 9-12. (To be continued.)

An Elastic Theory for Rubber. E. Latshaw, *J. Franklin Inst.*, July, 1942, pp. 63-73.

DUNLOP FATIGUE TEST FOR RUBBER COMPOUNDS. V. E. Gough and D. Parkinson, *India-Rubber J.*, June 27, 1942, pp. 9-13. (To be continued.)

THEOP—NEW PLASTICIZER FOR SYNTHETIC RUBBER. *Rubber Age (N. Y.)*, July, 1942, p. 298.

PROPERTIES AND USES OF RESISTOFLEX PVA—A RUBBER-LIKE COMPOUND. H. E. Krebs, *Rubber Age (N. Y.)*, July, 1942, pp. 299-301.

ABSTRACTS OF UNITED STATES PATENTS ON THE COMPOUNDING AND USE OF SYNTHETIC RUBBER. F. Marchionna, *Rubber Age (N. Y.)*, July, 1942, pp. 302-304. (To be continued.)

"THE RUBBER AGE" EMERGENCY RECLAIM PLAN. III. F. N. Pickett, *Rubber Age (London)*, June, 1942, pp. 84, 86, 88. (To be continued.)

RUBBER—EFFORTS TO PROVIDE SUBSTITUTE SOURCES OF SUPPLY. *The Index*, Summer, 1942, pp. 25-33.

CRYSTALLIZATION PHENOMENA IN RAW RUBBER. L. R. G. Treloar, *Rubber Chem. Tech.*, Apr., 1942, pp. 251-64.

COMPARISON BETWEEN THE OBSERVED DENSITY OF CRYSTALLINE RUBBER AND THE DENSITY CALCULATED FROM X-RAY DATA. W. H. Smith and N. P. Hanna, *Rubber Chem. Tech.*, Apr., 1942, pp. 265-71.

Compounding Buna S

(*Continued from page* 458)

Permanent set, as determined by stretching the samples to 75% of the breaking elongation for 10 minutes and then reading the sample length 10 minutes after release and expressing the increase in elongation as per cent. of the original length, is much lower for Buna S compounds than for natural rubber compounds. (See Figure 10.)

The T-50 test was found to be of no value as a means of determining the extent of cure in Buna S compounds. (See Figure 11.)

Because of the difficulties in obtaining good correlation between laboratory abrasion tests and service life of tread compounds of natural rubber, no abrasion tests on these natural rubber and Buna S tread compounds were made because the results that might have been obtained were not considered as justifying the effort.

(To be continued)

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
Anaconda Wire & Cable Co.	Com.	$0.50	July 20	July 10
Boston Woven Hose & Rubber Co.	Com.	$1.00 extra	Aug. 25	Aug. 15
Boston Woven Hose & Rubber Co.	Com.	$0.50	Aug. 25	Aug. 15
Collyer Insulated Wire Co.	Com.	$0.50 q.	July 1	June 24
Crown Cork & Seal Co., Ltd.	Com.	$0.50 q.	Aug. 15	July 31
Dayton Rubber Mfg. Co.	Com.	$0.25	Aug. 1	July 17
Dayton Rubber Mfg. Co.	$2 Cum. Pfd. "A"	$0.50 q.	Aug. 1	July 17
Detroit Gasket & Mfg. Co.	Pfd.	$0.30 q.	Sept. 1	Aug. 15
DeVilbiss Co.	Com.	$0.50	July 15	June 29
DeVilbiss Co.	7% Pfd.	$0.175 q.	July 15	June 29
Dunlop Rubber Co., Ltd.	(Am. Dep. Rec.) for Ordinary (Regis.)	$0.15	June 26	May 26
Firestone Tire & Rubber Co.	Com.	$0.25	July 20	July 3
Firestone Tire & Rubber Co.	6% Pfd. "A"	$1.50 q.	Sept. 1	Aug. 15
General Cable Corp.	Pfd.	$1.75 accum.	Aug. 1	July 25
Hercules Powder Co.	Pfd.	$1.50 q.	Aug. 15	Aug. 4
Lee Rubber & Tire Corp.	Com.	$0.75	Aug. 1	July 15
Midwest Rubber Reclaiming Co.	Com.	$0.50	Aug. 1	July 20
Midwest Rubber Reclaiming Co.	$4 Pfd.	$1.00 q.	Sept. 1	Aug. 20
Norwalk Tire & Rubber Co.	Pfd.	$0.4375 accum.	Oct. 1	Sept. 14
Norwalk Tire & Rubber Co.	Pfd.	$0.875 q.	Oct. 1	Sept. 14
Okonite Co.	Com.	$0.50 extra	Aug. 1	July 15
Okonite Co.	Com.	$1.50 q.	Aug. 1	July 15
Pharis Tire & Rubber Co.	Com.	$0.15 irreg.	July 25	July 10
Pharis Tire & Rubber Co.	Com.	$0.15	July 25	July 10
Philadelphia Insulated Wire Co.	Com.	$0.25 irreg.	Aug. 15	Aug. 1
Rome Cable Corp.	Com.	$0.15 q.	July 1	June 11
Seiberling Rubber Co.	"P" Pfd.	$0.625 q.	July 1	June 20
Seiberling Rubber Co.	"A" Pfd.	$1.25 q.	July 1	June 20
Thermoid Co.	Com.	$0.10 irreg.	July 1	June 22
Tyer Rubber Co.	Pfd.	$1.50 q.	Aug. 15	Aug. 6
U. S. Rubber Reclaiming Co., Inc.	Pr. Pfd.	$0.50 accum.	July 15	July 10
S. S. White Dental Mfg. Co.	Com.	$0.30	Aug. 15	July 31
Western Electric Co., Inc.	Com.	$0.25 reduced	June 30	June 25

Patents and Trade Marks

APPLICATION

United States

2,279,513. **Valve Structure with Hard Rubber Valve Seating Member.** D. Hage, Hoorn, Netherlands.

2,279,673. **Grinding Disk with a Rubber Cushion Secured to the Head.** A. H. Graenser, assignor of one-half to D. E. Meyer, both of Detroit, Mich.

2,279,708. **Cosmetic Fluid Applicator with an Elastic Diaphragm Fitted in a Hollow Handle.** L. V. Jakob and F. Goldfisher, assignors to E. A. Persen, all of Chicago, Ill.

2,279,761. **Nurse's Uniform with Elastic Panels in the Waist Section.** A. Schatten, New York.

2,279,799. **Noise Maker for Hollow Rubber Toys.** J. F. Stanford, Cuyahoga Falls, assignor to S. W. Anderson, doing business as Anderson Rubber Co., Akron, both in O.

2,279,927. **Spray-Gun Container Lid Having a Tube therethrough and Compressible Material between Tube and Lid.** C. F. Noth, Chicago, Ill.

2,279,944. **Floor Mat Comprising Links of Vulcanized Rubber Tire Casing Stock Having Fibrous Strands Embedded therein.** A. R. Hendry, Portland, Mich.

2,279,951. **Sneaker.** D. Morein, New York, N. Y.

2,280,006. **Tire Rivet.** C. Pfeifer, Milwaukee, Wis.

2,280,025. **Surgical Stocking Having a Closable Open Side.** J. M. Bollinger, New York, N. Y.

2,280,074. **Molding Core Comprising a Hollow Frangible Supporting Member Enclosed in a Rubber Sack.** T. M. Halsall, assignor to Toyad Corp., both of Latrobe, Pa.

2,280,183. **Non-Metallic Pipes and Resilient Gaskets therefor.** C. E. Bennett, Ridgewood, N. J.

2,280,208. **Press Roll for Paper Making Machines Comprising a Rubber Binder Having Pieces of Rock Intermingled therewith.** R. J. Wilkie, Newton, assignor to Stowe-Woodward, Inc., Newton Upper Falls, both in Mass.

2,280,312. **Razor Blade Sharpener with Base Block of Rubber Supporting a Thin Concave Cylindric Plate of Steel without Exerting Warping Strains on the Plate.** E. H. Schipper, Pasadena, Calif.

2,280,389. **Window Construction Utilizing Compressible Resilient Stripping.** H. Edwards, assignor to O. M. Edwards Co., Inc., both of Syracuse, N. Y.

2,280,395. **Truss.** J. E. Hansen, Rochester, N. Y.

2,280,410. **Nursing Bag with Removable Flexible Teats.** H. R. Keltner, Johnson County, Kans.

2,280,568. **Aircraft Wheel Having a Solid Rubber Tire.** R. W. Brown, assignor to General Tire & Rubber Co., both of Akron, O.

2,280,622. **Shoe with Continuous Elastic Means Secured to the Edge Opening.** F. Brewin, St. Louis County, assignor to International Shoe Co., St. Louis, both in Mo.

2,280,624. **Scalp Massage Cap Comprising a Rubber Bowl-Shaped Body Having a Series of Inwardly Extending Fingers Protruding from the Bowl Face.** R. F. Buckley, East Cleveland, O.

2,280,711. **High-Tension Apparatus with a Conductor Cable Enclosed within a Layer of a Rubber Compound.** R. R. Machlett, New Canaan, and J. W. Skehan, Stamford, assignors to Machlett Laboratories, Inc., Springdale, all in Conn.

2,280,855. **Shielded Spark Plug Cable Terminal and a Tubular Sleeve of Rubber Surrounding the Cable.** J. J. Rose, Dayton, O.

2,280,857. **Oil Seal Comprising a Metal Holder Provided with an Annular Flange, Embedded in and Bonded to a One-Piece, Annular Synthetic Rubber Member.** J. W. Saffold, Cleveland, O.

2,280,915. **Device for Irrigating and Treating Wounds, Including a Flexible Pad with Sealing Flange and Cupped Extension with Drain Passage Means.** J. H. Johnson, Toronto, Ont., Canada.

2,281,010. **Bearing Seal with an Annular Flat Seal Disk of Flexible and Resilient Lubricant-Resistant Rubber-Like Material.** H. R. Reynolds and L. A. Hilles, assignors to Fafnir Bearing Co., all of New Britain, Conn.

2,281,111. **Cable with Non-Metallic Sheath and Rubber Insulation.** W. C. Robinson, Sewickley, Pa., and R. W. E. Moore, Riverdale, N. Y., assignors to National Electric Products Corp., a corporation of Del.

2,281,145. **Pipe Plug with Resilient Sealing Member.** H. S. Duey, Los Angeles, Calif.

2,281,148. **Wrapped Belt with Compression Section of Rubber Composition Reenforced with Fine Textile Fibers.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,281,321. **Rubber Overshoe.** F. F. Olson, Belmont, and L. H. L'Hollier, Waltham, Mass., assignors to B. F. Goodrich Co., New York, N. Y.

2,281,342. **Garment Supporter.** D. and E. R. Visconti, both of South Weymouth, Mass.

2,281,359. **Plow-Tail Wheel Having a Pneumatic Tire with a Conical Tread Face.** C. E. Kenner, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,281,367. **Floor Polish Applying Device with a Solid Rubber Yieldable Backing Member Secured to the Flange of a Hollow Liquid Receiving Body.** N. J. Moll, Washington, D. C.

2,281,417. **Safety Valve Utilizing a Bellows.** D. A. Darby, assignor of one-half to G. F. Smith, both of Wichita Falls, Tex.

2,281,533. **Corset.** V. Buchanan, New York, N. Y.

2,281,594. **Heat Exchanger Having a Series of Tubes and a Tube Sheet Comprising an Annulus of Rubber-Like Material.** W. A. Pearl, Chicago, Ill.

2,281,600. **Rectal Dilator.** J. R. Ross, assignor to E. E. Ross, both of New York, N. Y.

2,281,606. **Stocking of the Strain-Absorber Type with a Band of Covered Rubber Yarn Having a Tendency to Curl.** H. B. Snader, Temple, assignor to Vanity Fair Silk Mills, Reading, both in Pa.

2,281,722. **Circular Rubber Supporting Pad for Sanding or Polishing Disk.** G. E. Smith, assignor to United States Electrical Tool Co., both of Cincinnati, O.

2,281,733. **Gravel Pump with a Yieldable Rubber Vane Fastened to a Radial Impeller.** I. O. Wallberg, San Luis Obispo, Calif.

2,282,003. **Electric Cable with Fibrous Tape Impregnated with Polymerized Material.** T. R. Scott, R. C. Mildner and T. E. D. Menzies, all of London, England, assignors to International Standard Electric Corp., New York, N. Y.

2,282,063. **Flexible Diaphragm for a Railroad Passenger-Car Vestibule.** W. C. Keys, Detroit, Mich., J. A. Younglove, Highland Park, Ill., and R. D. Gartrell, Oakland, and R. H. Hambidge, Nutley, both in N. J., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,282,159. **Teat Cup.** H. O. Berndt, assignor to H. H. Berndt, both of Hartford, Wis.

2,282,168. **Decorative Upholstery Fabric Having a Flat Strip of Soft, Cured Rubber at Its Rear Surface.** G. R. Cunnington, Grosse Pointe Park, Mich., assignor to National Automotive Fibres, Inc., a corporation of Del.

2,282,170. **Stuffed Pleated Cushion Having Narrow Strips of Soft Cured Rubber in the Spaces between Wide Strips of Bulky Padding Material.** G. R. Cunnington, Grosse Pointe Park, assignor to National Automotive Fibres, Inc., Detroit, both in Mich.

2,282,181. **Antiseptic Fabric Comprising a Fabric Sheet Coated with a Waterproofing Agent (Pyroxylin, Oxidized Oil, or Synthetic Resins) and Having an Antiseptic Substance Incorporated therein.** R. H. Guinzburg, Montrose, assignor to I. B. Kleinert Rubber Co., New York, both in N. Y.

2,282,220. **Head Band for Use with Bathing Caps.** A. L. Gage, St. Paul, Minn.

2,282,239. **General Bushing Seal with a Rubber-Like Toroidal Member.** A. M. Opsahl, Forest Hills, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, both in Pa.

2,282,258. **Double Wall Container Composed Essentially of Rubber Hydrochloride, the Outer Wall Being Plasticized, and the Inner Wall Unplasticized.** J. E. Snyder, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,282,277. **Thermometer Having a Cup-Shaped Housing with Elastic Shock Absorbing Walls.** E. S. Whittier, Bristol, assignor to Cooper Oven Thermometer Co., Pequabuck, both in Conn.

Dominion of Canada

404,469. **Rubber Glove with Thickened Elastic Wrist Band.** R. S. Lewis, Willard, O., U. S. A.

404,489. **Sealed Container with a Resilient Rubber Plug in a Vent Hole.** American Can Co., New York, assignee of J. M. Hothersall, Brooklyn, both in N. Y., U. S. A.

404,499. **Bowling Alley Approach Having a Resilient Mat.** Brunswick-Balke-Collender Co. of Canada, Ltd., assignee of R. E. Kennedy, both of Toronto, Ont.

404,539. **Panel Mounting Including a Solid Rubber Strip.** Hunter Sash Co., Inc., assignee of L. G. Hunter, both of Flushing, L. I., N. Y., U. S. A.

404,555. **Vibratory Screen with a Pneumatic Tube Adapted to Inflate and Deflate to Regulate the Resiliency.** Niagara Screens & Machines, Ltd., assignee of R. Stroud, both of Toronto, Ont.

404,574. **Resilient Wheel with Elastic Shear Elements.** Transit Research Corp., assignee of E. H. Piron, both of New York, N. Y., U. S. A.

404,645. **Puncture Sealing Tire Tube.** E. T. Wyman, Brookline, Mass., U. S. A.

404,698. **Electric Plug Connector with Resilient Body.** Hatfield Wire & Cable Co., Union assignee of H. Charmoy, Hillside, both in N. J., U. S. A.

404,791. **Valve or Cock with Resilient Wall.** T. W. Miller, Johannesburg, Transvaal, South Africa.

404,796. **Non-Skid Tire with a Plurality of Wires Positioned on and below the Tread Surface.** P. S. Smyth, Dumfermline, Fife, Scotland.

404,859. **Rubber Valve Stem.** Dill Mfg. Co., Cleveland, assignee of J. C. Crowley, Cleveland Heights, both in O., U. S. A.

404,939. **Corset.** L. J. A. Amyot, Quebec, P. Q.

404,989. **Joint Construction with Yieldable Annulus between Bearing and Housing.** Columbus Auto Parts Co., assignee of W. A. Flumerfelt, both of Columbus, O., U. S. A.

404,987. **Temperature Controlled Valve with Resilient Diaphragm.** Clifford Mfg. Co., assignee of W. B. Clifford, Boston, Mass., U. S. A.

404,999. **Rubber Lined Pickling Tank.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of O. S. True, Scarsdale, N. Y., and E. R. Beecher, Westfield, N. J., co-inventors, both in the U. S. A.

405,005. **Garment Band Comprising a Strip of Sheet Rubber.** Faultless Mfg. Co., assignee of J. F. Hargreaves, Baltimore, Md., U. S. A.

405,022. **Shock Absorber with Rubber Core.** W. H. Miner, Inc., Chicago, assignee of A. E. Dentler, Hinsdale, both in Illinois, U. S. A.

405,037. **Rubber Shoulder Strap Pad.** A. Stein & Co., Ltd., Toronto, Ont., assignee of C. Bullinger, Riverside, Ill., U. S. A.

405,044. **Window Glazing Device with Rubber Channel Member.** A. S. and B. Cheston and E. C. Edmonds, each an assignee of one third of the interest, all of Birmingham, England; A. S. Cheston, assignee of F. A. Oldham, Birmingham, England.

405,091. **Laminated Paper and Cardboard United with a Composition Consisting of Pitch and Bitumen and a Sufficient Amount of Latex to Check Migration of the Substance through the Laminations.** C. Metcalf, Wilmslow, Cheshire, England.

405,119. **Brassiere and Sponge Rubber Breast Pad.** Berger Bros. Co., New Haven, assignee of L. H. Loeffel, West Haven, both in Conn., U. S. A.

405,215. **Relief Valve for Fuel Pumps with Synthetic Rubber Diaphragm Cup.** W. L. Davis, Avon, O., U. S. A.

405,420. **Therapeutic Apparatus with Elastic Membranous Applicator Bag.** L. B. Newman, Chicago, Ill., U. S. A.

405,498. **Tire Tube with Fluid Pressure Retaining Device.** Firestone Tire & Rubber Co., assignee of R. F. Wilson and J. W. Liska, co-inventors, all of Akron, O.

405,557. **Resilient Sealing Ring for Conduit Joint.** Vickers, Inc., assignee of J. A. Martin, both of Detroit, Mich., U. S. A.

405,560. **Tobacco Pouch of Chloride of Rubber Sheets.** Seal-O-Sac (Canada) Ltd., assignee of P. M. Yeates, both of Toronto, Ont.

405,576. **Camp Cooking Kit Comprising a Plurality of Culinary Vessels Adapted to Be Placed within Each Other, and Elastic Rings on Each Lid.** S. Skerfving, Malmö, and A. Lindstrom, Dvarsatt, co-inventors, both in Sweden.

405,614. **Spliced Cable Joint with Rubber Splicing Material.** American Steel & Wire Co. of N. J., Cleveland, O., assignee of J. M. Marlborough, Millbury, and J. J. Morrison, Worcester, co-inventors, both in Mass., U. S. A.

405,638. **Railway Brake Beam with Rubber Block Material between the Beam Members.** Chicago Railway Equipment Co., assignee of I. J. Spaeth and E. G. Busse, co-inventors, all of Chicago, Ill., U. S. A.

405,651. **Building Partition Board with a Layer of Poor Vibration-Transmitting Properties Consisting of Rubber, Cork, and Fiberboard.** Imperial Chemical Industries, Ltd., assignee of V. Lefebure, both of London, England.

405,676. **Flexible Electrical Conductor Having a Layer of Rubber Hydrochloride Surrounding the Conductor, and a Layer of Felted Asbestos in Direct Contact with the Rubber.** Rockbestos Products Corp., New Haven, assignee of J. W. Greenleaf, Hamden, both in Conn., U. S. A.

405,681. **Drilling Tube Mud Wiper with a Disk of Elastic Material.** Shell Development Co., San Francisco, and C. S. Penfield and U. M. Warren, co-inventors, both of Bakersfield, both in Calif., U. S. A.

405,790. **Ironing Pad Cover Having a Woven Asbestos Fabric Impregnated with a Thermoplastic Alkyd Resin.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of N. G. Madge, Montclair, N. J., U. S. A.

405,797. **Tire Tread with Circumferentially Extending Rib.** Firestone Tire & Rubber Co., Akron, O., U. S. A., assignee of Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of A. Hargraves, Silver Lake, O., U. S. A.

United Kingdom

544,069. **Hand Atomizers or Sprayers.** F. C. B. Packer and T. G. Summers.
544,089. **Electrical Insulating Materials.** Pirelli-General Cable Works, Ltd., H. Barron, and B. O. Ashford.
544,148. **Rubber Molding.** Expanded Rubber Co., Ltd., H. N. Shelmerdine, and A. V. Clarke.
544,182. **Cushion or Mattress.** Wingfoot Corp.
544,272. **Sponge Rubber Cleansing Articles.** United States Rubber Co.
544,338. **Wheels, Tires, or Tire Treads.** C. R. MacCallum.
544,372. **Soles for Footwear.** B. F. Goodrich Co.
544,427. **Electric Cables.** British Insulated Cables, Ltd., and P. W. Cave.
544,670. **Self-Sealing Pneumatic Tires and Tubes.** Dunlop Rubber Co., Ltd., F. G. W. King, and D. Bulgin.
544,732. **Reenforced-Rubber Packing Washers, Disks, Gaskets, and Oil Seals.** G. Angus & Co., Ltd., and A. Procter.
544,740. **Cellular Materials for Buoyancy Purposes.** Expanded Rubber Co., Ltd., and A. Cooper.
544,811. **Girdles, Etc.** H. M. Herbener.
544,841. **Windshield Cleaner.** Trico Products Corp.
545,162. **Elastic Cushioning or Anti-Vibration Devices.** Daimler-Benz Akt.-Ges.
545,164. **Elastic Hosiery.** R. and J. Pickles.
545,341. **Machinery Packing.** Garlock Packing Co.
545,353. **Hydraulic Gun-Firing Mechanism.** India-Rubber, Gutta Percha & Telegraph Works Co., Ltd., F. J. Tarris, and D. Webb.
545,354. **Electric Cables.** British Insulated Cables, Ltd., and J. C. Quayle.
545,366. **Windscreen-Wipers.** Acrotorque Co.
545,437. **Fluid-Sealing Packing for Rotary Parts.** Roadless Traction, Ltd., and D. Johnson.
545,492. **Tires.** G. F. Campbell.
545,508. **Target Game Boards.** Dunlop Rubber Co., Ltd., and G. Vaughan.

PROCESS

United States

2,282,425. **Stuffed Pleated Upholstery Having Strips of Soft Rubber between Batts.** J. R. Millar, Reno, Nev., assignor to National Automotive Fibres, Inc., Detroit, Mich.
2,282,578-2,282,580. **Treading Tire Casings.** P. E. Hawkinson, assignor to Paul E. Hawkinson Co., both of Minneapolis, Minn.
2,283,183. **Producing Self-Sealing Tubes by Superimposing on the Tread Portion of a Curing Bag a Rubberized Fabric Strip; Applying over It a Strip of Unvulcanizable Plastic Rubber Whose Width Is Less Than That of the Fabric Strip; Next Applying a Cover Strip of Vulcanizable Rubber of Sufficient Width to Overlap the Underneath Strips; Placing the Assembly into a Vulcanizing Mold; Vulcanizing; Removing the Strips from the Curing Bag; and Permanently Applying the Shield to the Tread Portion of an Inner Tube.** F. G. Carnahan, Akron, O.
2,283,238. **Manufacturing Elastic Bags by the Dipping Process.** R. E. Thompson, Nyack, N. Y., assignor to Lorica Laboratories, Inc., Jersey City, N. J.
2,283,316. **Producing Closed-Cell Gas-Expanded Material by Releasing the Vulcanized Rubber from Its Confinement in a Mold While Still Hot, and Expanding the Rubber to the Final Size and Shape by Means of the Gas Internally Developed by the Decomposition of the Chemical Blowing Agent.** L. Cooper, Milford, Conn., and D. Roberts, assignors to Rubatex Products, Inc., both of New York, N. Y.
2,283,604. **Making Sponge Rubber by Subjecting an Aqueous Dispersion of a Rubber Material in a Closed Container to Dichloro Difluoro Methane Gas.** M. M. Harrison, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,283,845. **Variegated Ball from Differently Colored Sheets of Sponge Rubber.** C. W. Brown, Chicago, Ill.
2,284,265. **Providing a Ball Body with a Jointless Outer Cover.** V. H. Hurt, Cranston, R. I., assignor to United States Rubber Co., New York, N. Y.
2,284,307. **Slitting an Elastic Shoe Outsole.** P. A. Sperry, New Haven, Conn., assignor to United States Rubber Co., New York, N. Y.
2,284,727. **Decorative Upholstery Fabric with Soft Rubber Riser Element.** G. R. Cunnington, Grosse Pointe Park, assignor to National Automotive Fibres, Inc., Detroit, Mich.
2,284,761. **Rubber Lining for a Hollow Body.** T. D. Nathan, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,284,882. **Fitting Heel Seats of Rubber Sole Shoes.** P. L. Sinclair, assignor to Lumbard-Watson Co., both of Auburn, Me.
2,285,335. **Embossed Plied Material Comprising an Embossed, Vulcanized Rubber Sheet and a Non-Elastic Sheet Adhered thereto.** V. H. Hurt, Cranston, R. I., assignor to United States Rubber Co., New York, N. Y.
2,285,526. **Cavitied Rubber Sheeting.** J. U. Mann, Arlington, N. J., assignor to United States Rubber Co., New York, N. Y.
2,285,755. **Insulating Tape.** C. Mosier and J. L. Mohun, Jr., both of Chicago, Ill., assignors to Union Asbestos & Rubber Co., a corporation of Ill.
2,286,117. **Perforate Bags.** A. E. Sidnell, Akron, assignor to Seiberling Latex Products Co., Barberton, both in O.
2,286,968. **Method of Continuously Making Vulcanized Fiber wherein a Plurality of Cellulose Webs Are Passed through a Peptonizing Bath and Then Formed into a Continuous Laminated Strip While Still in a Comparatively Unweakened Condition.** G. E. Landt, Norristown, Pa., assignor to Continental-Diamond Fibre Co., Newark, Del.
2,287,095. **Degrading of Rubber from Waste Rubber Products.** A. G. Federman, Chester, Pa.
2,287,163. **Seal and Joint for Deep-Sea Cables Utilizing Hard Rubber, a Vulcanizable Compound, and Paragutta.** W. M. Bishop, Flushing, assignor to Bell Telephone Laboratories, Inc., New York, both in N. Y.
2,287,193. **Making Closed-Cell Cellular Rubber by Subjecting a Rubber Compound to a Neutral Gas, Relieving the Compound of the Gas Pressure, and Permitting It to Expand, and Then Vulcanizing the Compound by Heat under Conditions Which Prevent Further Expansion.** R. L. Overstreet, Bedford, Va., assignor, by mesne assignments, to Salta Corp., Jersey City, N. J.
2,287,282. **Tread with a Multiplicity of Flexible Tread Ribs of Rubber-Like Material.** N. E. Tousley, Waban, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

404,527. **Tire Vulcanization.** Firestone Tire & Rubber Co., assignee of R. W. Brown, both of Akron, O., U. S. A.
404,528. **Elastic Filament Manufacture.** Firestone Tire & Rubber Co., Akron, O., assignee of H. W. Greenup, Fall River, Mass.
404,620. **Production of Tire Cord Which Comprises Coating a Cellulose Yarn with an Aqueous Dispersion of Rubber in Intimate Admixture with an Alkaline Cellulose Xanthogenate.** H. Dreyfus, London, England.
405,149. **Corrugated Rubber Gas-Mask Tube Free from Cells and Cavities.** Dewey & Almy Chemical Co. of Canada, Ltd., Ville La Salle, P. Q., assignee of W. C. Ross, Winchester, and E. E. Anderson, Auburndale, co-inventors, both in Mass., U. S. A.
405,510. **Rubber Heel Plugs.** Holtite Rubber Co. of Canada, Ltd., Drummondville, P. Q., assignee of A. A. Esterson, Baltimore, Md., U. S. A.
405,571. **Laminated Elastic Fabric.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of M. C. Teague, Ridgewood, N. J., and T. G. Hawley, Jr., Naugatuck, Conn., co-inventors, both in U. S. A.
405,635. **Decorative Upholstery Fabric with Soft Rubber Riser Members Vulcanized to the Back of the Fabric.** National Automotive Fibres, Inc., Detroit, assignee of G. R. Cunnington, Grosse Pointe, both in Mich., U. S. A.
405,677. **Closed-Cell Gas-Expanded Rubber.** Rubatex Products, Inc., New York, N. Y., assignee of L. Cooper, Milford, Conn., and D. Roberts, New York, N. Y., U. S. A.
405,851. **Production of a Rubber-Coated Conductor Comprising Applying to a Metallic Core Alternate Layers of a Vulcanizable Latex Compound and of a Latex Compound Free of Vulcanizing Ingredients, Heating to Dry the Latter Compound, and Repeating the Steps until a Coating of Desired Thickness Is Obtained.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of F. S. Bartlett, Bristol, R. I., U. S. A.

United Kingdom

544,138. **Compositions of Rubber.** Dunlop Rubber Co., Ltd., A. S. Carpenter, and D. F. Twiss.
544,449. **Concentrating Dispersions of Rubber and Rubber-Like Substances.** Revertex, Ltd. (Metallges. Akt.-Ges.).
544,703. **Cellular Rubber Having Fluid-Tight Cells.** Soc. Franco-Belge du Caoutchouc Mousse.
544,745. **Placing Sleeves on Drums.** Dunlop Rubber Co., Ltd., and R. A. Farnell.
544,757. **Pneumatic Tire.** United States Rubber Co.
544,864. **Laminated Endless Belt.** Dunlop Rubber Co., Ltd. (Dunlop Tire & Rubber Goods Co., Ltd.).
544,905. **Hollow Rubber Articles.** Dunlop Rubber Co., Ltd., S. D. Taylor, and E. A. Murphy.
545,302. **Gas-Expanded Rubber.** Expanded Rubber Co., Ltd., and A. Cooper.

CHEMICAL

United States

2,282,371. **Coated Sheet Materials Comprising a Composition Containing a Polyvinyl Phthalate and a Phthalate of the Monomethyl Ether of Ethylene Glycol as a Plasticizer Applied to a Rubberized Fabric Base, and Having a Coating of Nitrocellulose Lacquer.** J. H. McGill, Manchester, England, and H. J. Tattersall, Ardrossan, Scotland, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
2,282,941. **Preserving Rubber by Incorporating therein an N-Disubstituted Alpha-Amino Beta-Acyl Ethane.** C. Coleman, Montclair, N. J., assignor to United States Rubber Co., New York, N. Y.
2,283,236. **Sulphonated Derivatives of Polymerized Methylstyrene.** F. J. Soday, Upper Darby, Pa., assignor to United Gas Improvement Co., a corporation of Pa.
2,283,334-2,283,337. **Vulcanization of Rubber Having Incorporated therein an Accelerator Consisting of 2-Mercapto-Thiazolines or Metal Salts thereof.** A. M. Neal, Wilmington, Del., and B. M. Sturgis, Pitman, N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,283,342. **Vulcanization of Rubber Having Incorporated therein an Accelerator Consisting of 2-Mercapto-Thiazolines or Metal Salts thereof.** B. M. Sturgis, Pitman, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,283,364. **Forming Substantially Dustless Agglomerates of Carbon Black.** H. Hanson, Charleston, W. Va., and R. W. Skoog, Borger, Tex., assignors to United Carbon Co., Inc., Charleston, W. Va.
2,283,388. **Antioxidant for Preserving Rubber Comprising a 4-Phenylamino 1-Alkyl 1, 2-Dihydrobenzofurane.** P. T. Paul, Naugatuck, and L. H. Howland, Cheshire, both in Conn., assignors to United States Rubber Co., New York, N. Y.
2,283,539. **Continuous Method for Making Solid Polystyrene from Liquid Styrene.** W. R. Collings, D. L. Gibb, and G. P. Schmelter, assignors to Dow Chemical Co., all of Midland, Mich.
2,283,627. **Process of Preparing High Molecular Weight, Halogen and Sulphur Derivatives of Linear, Plastic, Hydrocarbon Polymers Containing a Long Chain of Saturated Carbon Atoms Formed Essentially from an Iso-Mono-Olefin, Which Comprises Reacting the Polymers with a Small Amount of Sulphur Chloride Homogeneously Dissolved in a Larger Proportion of an Inert Solvent and Simultaneously Halogenating the Polymer by Reaction with Gaseous Chlorine.** A. H. Gleason, Westfield, N. J., assignor, by mesne assignments, to Jasco, Inc., Baton Rouge, La.
2,283,747. **Vulcanization of Rubber in the Presence of 2-Mercapto-Oxazolines or Salts thereof.** R. A. Mathes, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,284,280. **Synthetic Rubber-Like Materials from 1-Cyanobutadiene-1, 3 and 2-Chlorobutadiene-1, 3.** B. J. Habgood, E. Isaacs, and L. B. Morgan, all of Blackley, Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
2,284,281. **Synthetic Rubber-Like Material from 1-Cyanobutadiene-1, 3 and Butadienes-1, 3.** B. J. Habgood, E. Isaacs, and L. B. Morgan, all of Blackley, Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
2,284,284. **Preserving Rubber by Treating It with an Aldehyde Reaction Product of an Aliphatic Ketone-Arylamine Condensation Product, and in Addition thereto an N, N'-Diaryl Phenylene Diamine As an Activator for the Reaction Product.** L. H. Howland, Cheshire, Conn., assignor to United States Rubber Co., New York, N. Y.
2,284,335. **Electrical Insulating Material Comprising an Intimate Mixture of Styrene, Benzoyl Peroxide Polymerization Accelerator, and Dibutylphthalate Which Functions First As a Plasticizer and Then to Harden the Composition.** E. O. Meyer, Teaneck, N. J., assignor to Consolidated Edison Co. of New York, Inc., New York, N. Y.
2,284,432. **Plastic Composed of Rubber, Sulphur, Aluminum Stearate, Powdered Silica, Wood Flour, and Sugar.** J. A. Kennedy, Los Angeles, Calif.
2,284,576. **Vulcanization of Rubber in the Presence of a Salt in Which 2-Mercaptothiazoline Is Combined with a Quarternary Ammonium Compound Derived from a Heterocyclic Nitrogen Base.** P. C. Jones and R. M. Mathes, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.
2,284,577. **Vulcanization of Rubber in the Presence of a Salt in Which a 2-Mercaptothiazoline Is Combined with a Polyamine Containing at Least Two Primary Amino Groups.** P. C. Jones and R. A. Mathes, both of Akron, O.,

assignors to B. F. Goodrich Co., New York, N. Y.

2,284,578. **Vulcanization of Rubber in the Presence of an N-Thioamine and a Compound Stable at Room Temperatures, But Which Decomposes at Vulcanizing Temperatures with the Formation of Carbon Disulphide.** P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,284,579. **Vulcanization of Rubber in the Presence of a Non-Reverting Accelerator and Thiuram Disulphide in the Absence of Added Free Sulphur.** P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,284,610. **Dispersion of Pigments in Rubber.** H. A. Sweet, Westfield, N. J., assignor to General Dyestuff Corp., New York, N. Y.

2,284,772. **Improved Titanium Pigments.** G. R. Seidel, Baltimore, Md., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,285,032. **Age Resisting Rubber Composition Containing a Product Obtained by Reacting Indene and a Secondary Diaryl Amine in Which only Secondary Amino Groups Are Present.** J. R. Ingram, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,285,077. **Vulcanization Accelerator.** D. J. Beaver, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,285,259-2,285,260. **Method of Retarding the Deterioration of Vulcanized Rubber Due to the Catalytic Effect of Copper in Contact with the Rubber.** F. B. Downing, Carneys Point, N. J., A. M. Neal, Wilmington, Del., and C. J. Pedersen, Penns Grove, N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

2,285,416. **Coumarone-Indene Resin.** F. W. Corkery, Crafton, and R. H. Bailey, Clairton, both in Pa., assignors to Pennsylvania Industrial Chemical Corp., a corporation of Pa.

2,285,417. **Coumarone-Indene Resin.** F. W. Corkery, Crafton, Pa., assignor to Pennsylvania Industrial Chemical Corp., a corporation of Pa.

2,285,458. **Age-Resistant Pressure-Sensitive Adhesive Composition Comprising Rubber and a Material Selected from the Group Consisting of Rosins, Rosin Acids, and Rosin Acid Esters.** E. Pragoff, Jr., assignor to Hercules Powder Co., both of Wilmington, Del.

2,285,485-2,285,486. **Titanium Dioxide Pigments.** J. Barksdale, New York, N. Y., and W. W. Plechner, Metuchen, N. J., assignors to National Lead Co., New York, N. Y.

2,285,562. **Styrene Copolymer Composition.** E. C. Britton, G. H. Coleman, and J. W. Zemba, assignors to Dow Chemical Co., all of Midland, Mich.

2,285,570. **Pressure-Sensitive Adhesive Containing Polystyrene.** C. F. Cummins and K. D. Bacon, assignors to Dow Chemical Co., all of Midland, Mich.

2,285,763. **Printer's Blanket Comprising an Under Layer of Koroseal and a Thin Super-Coat of Cellophane.** G. A. Vasel, Philadelphia, Pa.

2,285,813. **Vulcanization of Rubber in the Presence of a Thiocarbamyl Sulphamine Wherein the Amine Group Attached to Sulphur Is a Primary Amine Group.** R. S. Hanslick, New Haven, Conn., assignor to United States Rubber Co., New York, N. Y.

2,285,843. **Nitrogen Generating Chemicals.** W. V. Smith, Nutley, N. J., assignor to United States Rubber Co., New York, N. Y.

2,286,230. **Gassing Rubber Using a Non-Oxidizing Mixture of Carbon Dioxide and Nitrogen.** D. Roberts, New York, and R. C. Bascom, Merrick, assignors to Rubatex Products, Inc., New York, both in N. Y.

2,286,505. **Polymerized Chloroprene Adhesive Containing Ethyl Cellulose.** J. L. Perkins, Arlington, assignor to B. B. Chemical Co., Boston, both in Mass.

Dominion of Canada

404,601. **Making Sponge Rubber Which Comprises Foaming and Adding Free Sulphur to a Latex Containing Sulphur Chemically Combined with the Latex, and Causing at Least Some of the Added Sulphur to Combine with the Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of L. A. Murray, Jr., Passaic, N. J., U. S. A.

404,602. **Manufacturing a Rubber Article by Gelling a Heat-Sensitive Latex Composition in the Desired Shape, Allowing the Gel to Synerize in an Aqueous Bath Having a pH above 9, and Further Drying by Evaporation.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of B. W. Bender, Wanaque, N. J., U. S. A.

404,603. **Manufacturing a Rubber Article Which Comprises Gelling a Heat-Sensitive Latex Composition in the Desired Shape, Allowing the Gel to Synerize in an Aqueous Bath Having a pH between 3 and 5, and Further Drying by Evaporation.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of H. F. Jordan, Nutley, N. J., U. S. A.

United Kingdom

544,127. **Butadiene.** A. L. Mond. (Universal Oil Products Co.).

544,139. **Butylenes, Butadiene and Chloro-Butanes.** A. Abbey (Dow Chemical Co.).

544,337. **Vulcanizing Rubber, Balata, Gutta Percha, Synthetic Rubber, and Like Substances and Dispersions thereof.** Rubber-Stichting.

544,387. **Chlorinated Rubber Hydrochloride.** Raolin Corp.

544,944. **Coated Regenerated Cellulose Sheets or Films.** British Cellophane, Ltd.

544,968. **Vulcanization Accelerator.** United States Rubber Co.

545,121. **Solid Soluble Rubber Derivatives.** Scientific & Industrial Research (Honorary Advisory Council For).

545,324. **Interpolymers of Styrene with Heat-Blended Oil Varnishes.** E. I. du Pont de Nemours & Co., Inc., R. B. Flint, and H. S. Rothrock.

MACHINERY

United States

2,282,593. **Apparatus to Manufacture Contoured Mats, Etc.** P. C. Richardson, assignor to Baldwin Rubber Co., both of Pontiac, Mich.

2,282,609. **Device to Stencil Articles.** D. G. Rempel, assignor to Sun Rubber Co., both of Barberton, O.

2,283,005. **Tire Tread Removing Machine.** E. M. Godfrey, Jr., Knoxville, Tenn.

2,283,014. **Apparatus for Tensioning Cord.** F. G. Reid, Toronto, Ont., assignor to Dunlop Tire & Rubber Goods Co., Ltd., Montreal, P. Q., both in Canada.

2,284,000. **Tire Mold Provided with Circumferentially Extending Thin Fins on the Tread Curing Portion.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,284,520. **Apparatus and Process for Producing Rubber Filaments, Sheets, Strips, Tubes, Etc., from Liquid Latex.** T. F. Hassett, Philadelphia, Pa.

2,284,549. **Apparatus for Plasticizing, Washing, or Dissolving Rubber, Etc.** L. Yablonski, assignor to Baker Perkins, Inc., both of Saginaw, Mich.

2,284,865. **Machine for the Extrusion of Plastic Masses, Such as Rubber.** B. Hansson, Stockholm, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, both in Sweden.

2,284,866. **Arrangement for the Continuous Manufacture of Rubber Hose.** B. Hansson, Stockholm, Sweden.

2,285,334. **Ball Winder.** V. H. Hurt, Cranston, R. I., assignor to United States Rubber Co., New York, N. Y.

2,285,389. **Tire Vulcanizing Press.** H. C. Bostwick, assignor to Akron Standard Mold Co., both of Akron, O.

2,285,922. **Tire Building Machinery.** J. I. Haase, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,286,134. **Tire Retreading Mold.** H. I. Houlette, Mansfield, O.

2,286,405. **Rubber Pelleting Machine with Means to Sprav a Tackiness-Destroying Medium upon the Pellets as They Emerge from a Perforating Shell.** W. A. Gordon, Shelton, assignor to Farrel-Birmingham Co., Inc., Ansonia, both in Conn.

2,286,716. **Sub-Stabilizer Shaping and Vulcanizing Mold.** E. J. Clark, Taft, Calif.

2,286,885. **Machine Comprising a Die for Swedging Elements.** W. J. Wiley, Waterbury, Conn., assignor to United States Rubber Co., New York, N. Y.

2,286,922. **Extruder.** J. A. Muller, Passaic, N. J., assignor to United States Rubber Co., New York, N. Y.

2,287,320. **Vulcanizing Implement for Footwear.** B. V. Mitchell, Jamaica, N. Y.

Dominion of Canada

404,529. **Latex Molding Apparatus.** Firestone Tire & Rubber Co., Akron, O., assignee of H. B. Morris, Pottersville, Mass., and J. N. Street, Akron, O., co-inventors, both in the U. S. A.

404,530. **Tire Inspection Apparatus.** Firestone Tire & Rubber Co., assignee of G. P. Bosomworth, both of Akron, O., U. S. A.

404,600. **Sheet Material Stripping Apparatus.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of H. C. Tingey, Nutley, N. J., U. S. A.

405,005. **Drier for a Continuous Moving Web of Wet Material.** Firestone Tire & Rubber Co., assignee of W. T. Runals, both of Akron, O., U. S. A.

405,083. **Tire Recapping Machine.** H. V. James, Denver, Colo., U. S. A.

405,285. **Apparatus for Producing Thread, Tubing, Strips, Etc., from Heat-Sensitive Latex.** Firestone Tire & Rubber Co., Akron, O., assignee of H. W. Greenup, Fall River, Mass., both in the U. S. A.

405,642. **Rubber Sheeting Perforating Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. N. Iknayan, Indianapolis, Ind., U. S. A.

405,791. **Annular Object Wrapper.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Eger, Grosse Pointe Park, Mich., U. S. A.

United Kingdom

544,767. **Apparatus and Process for the Manufacture of Elastic Rubber.** Sylvania Industrial Corp.

544,929. **Apparatus and Method for Wrapping Annular Objects.** United States Rubber Co.

545,041. **Machines for Applying Spots to Caps of the Crown Type.** Peters Bros. Rubber Co.

545,212. **Apparatus for Forming Washers, Etc.** United States Rubber Co.

UNCLASSIFIED

United States

2,282,387. **Inner Tube Valve Stem with Air Injection Nozzle.** F. B. Todd, Attalia, Ala.

2,282,608. **Hoist.** D. G. Rempel, assignor to Sun Rubber Co., both of Barberton, O.

2,282,907. **Parasiticide.** W. P. ter Horst, Packanack Lake, N. J., assignor to United States Rubber Co., New York, N. Y.

2,283,508. **Refrigeration Car Construction.** A. F. O'Connor, assignor to Union Asbestos & Rubber Co., both of Chicago, Ill.

2,283,601. **Indicator Mechanism for Tires.** E. Erickson, Lake Orion, Mich.

2,283,665. **Apparatus for Installing Rivets.** C. C. Cadden, Akron, O., assignor to B. G. Goodrich Co., New York, N. Y.

2,283,708. **Apparatus for Installing Collapsible Tubular Rivets.** H. L. Trautmann, Venice, Calif., assignor, by mesne assignments, to B. F. Goodrich Co., New York, N. Y.

2,283,743. **Testing Resilient Materials.** E. T. Lessig, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,283,756. **Convertible Bulkhead for Refrigerator Cars.** A. F. O'Connor and J. S. Lundvall, assignors to Union Asbestos & Rubber Co., all of Chicago, Ill.

2,284,299. **Tire Display Stand.** L. R. Owen, Cuyahoga Falls, O.

2,284,947. **Heat Insulating Insole.** J. J. Clifford, Reading, assignor to Stedfast Rubber Co., Inc., Mattapan, both in Mass.

2,284,971. **Tire Valve.** L. C. Broecker, Nichols, assignor to Bridgeport Brass Co., Bridgeport, both in Conn.

2,285,385. **Loom Controlling Mechanism.** W. F. Astley, Cicero, assignor to Union Asbestos & Rubber Co., Chicago, both in Ill.

2,285,569. **Tire Inflator.** J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.

2,285,751. **Pull Tab Attachment for Galoshes.** H. Tamaki, Toronto, Ont., Canada.

2,286,756. **Tire Display Sign.** J. T. Mullen, assignor to Dyment Co., both of Cleveland, O.

2,286,955. **Elastic Yarn Feeding Means for Knitting Machines.** A. N. Cloutier, Lonsdale, assignor to Hemphill Co., Central Falls, both in R. I.

2,287,273. **Tire Tread Gage.** M. Rabb, assignor to Atlas Supply Co., both of Newark, N. J.

TRADE MARKS

United States

395,055. **Penotrite.** Liquid solvent for carbon, tar, wax, grease, etc., on machine, fabric, rubber and lacquered surfaces. C. Voehringer, doing business as Penotrite Products Co., Long Island City, N. Y.

395,133. **Vanzak.** Extender for latex and dispersed rubber. R. T. Vanderbilt Co., Inc., New York, N. Y.

395,141. **Asbeston.** Asbestos yarns. United States Rubber Co., New York, N. Y.

395,181. **Avenger.** Tires. Goodyear Tire & Rubber Co., Akron, O.

395,212. **General.** Molded rubber goods. General Tire & Rubber Co., Akron, O.

395,236. **Liptex.** Corsets, etc. Dominion Corset Co., Ltd., Quebec, P. Q., Canada.

395,245. **Damsel Creations of Hollywood.** Clothing, including girdles, etc. A. B. Hammett, Inc., Los Angeles, Calif.

Market Reviews

Revised Price Schedule No. 87, as Amended—Scrap Rubber[1]

THE preamble and §§ 1315.1251 to 1315.1260, inclusive, of Revised Price Schedule No. 87[2] are amended and renumbered and are issued as Revised Price Schedule No. 87, as Amended—Scrap Rubber.

On January 31, 1942, Price Schedule No. 87[3] was issued, establishing maximum prices for the principal kinds of scrap rubber, consisting of tires, tire parts and tubes. As then stated in the preamble to the Schedule: The War being waged with the Japanese Empire made uncertain the future shipments of rubber from the Far East. In order to conserve for military and essential civilian purposes the rubber stockpile already accumulated in this country, it was necessary to curtail sharply the consumption of rubber in the manufacture of products not essential to the immediate national defense. This restriction upon the processing of crude rubber was expected to cause a marked increase in the use of such materials as reclaimed rubber which serve as substitutes for crude rubber. The demand for scrap rubber, the material from which reclaimed rubber is made, was expected to expand sharply, thereby producing grave danger of further price increases.

Scrap rubber prices had been rising steadily in recent months. The maximum prices fixed by Price Schedule No. 87 were based on prices prevailing shortly before the outbreak of the war in the Pacific.

Because of the vital importance to the nation's war effort of keeping the cost of substitution of reclaimed rubber for crude rubber to a minimum, the Office of Price Administration fixed the price of reclaimed rubber by Price Schedule No. 56.[4] As an essential and integral part of the Government's rubber program, and in order to make the other steps effective, it was necessary during the present emergency to establish the maximum prices for scrap rubber set forth in Price Schedule No. 87. Price Schedule No. 87, by order issued February 17, 1942,[5] was reissued under Section 206 of the Emergency Price Control Act of 1942 as Revised Price Schedule No. 87.[6]

This Revised Price Schedule No. 87, as Amended, continues in effect the maximum prices in effect under Revised Price Schedule No. 87 and establishes additional maximum prices for sales of scrap rubber not included in Revised Price Schedule No. 87.

In the judgment of the Price Administrator, the prices of scrap rubber, for which no maximum prices were established in Revised Price Schedule No. 87, have risen to an extent and in a manner inconsistent with the purposes of the Emergency Price Control Act of 1942. The Price Administrator has ascertained and given due consideration to the prices of such scrap rubber prevailing between October 1 and October 15, 1941, and has made adjustments for such relevant factors as he has determined and deemed to be of general applicability. So far as practicable, the Price Administrator has advised and consulted with representative members of the industry which will be affected by this Schedule.

In the judgment of the Price Administrator, the maximum prices established by this Revised Price Schedule No. 87, as Amended, are and will be generally fair and equitable and will effectuate the purposes of the Act. A statement of the considerations involved in the issuance of this Revised Price Schedule No. 87, as Amended, has been issued simultaneously herewith and filed with the Division of the Federal Register.

Authority: §§ 1315.1251 to 1315.1263, inclusive, issued under the authority contained in Pub. Law 421, 77th Cong.

§ 1315.1251 *Maximum prices for scrap rubber.* On and after June 26, 1942, regardless of any contract, agreement, lease or other obligation, no person shall sell or deliver scrap rubber to a consumer, and no consumer shall buy or receive scrap rubber, at prices higher than the maximum prices set forth in Appendix A hereof, incorporated herein as § 1315.1263; and no person shall agree, offer, solicit or attempt to do any of the foregoing: *Provided*, that a sale of scrap rubber articles or materials to a person who acquires them solely for the purpose of resale, or to repair or re-condition them to make them re-usable for their original purpose, shall not be deemed a sale to a consumer.

§ 1315.1252 *Licensing.* The provisions of Supplementary Order No. 5[7] — Licensing, are applicable to every dealer subject to this Revised Price Schedule No. 87, as Amended, selling scrap rubber to a consumer. The term "dealer" as used in this section shall have the meaning given it by Supplementary Order No. 5—Licensing.

§ 1315.1253 *Sales for export.* The maximum prices at which a person may export scrap rubber shall be determined in accordance with the provisions of the Maximum Export Price Regulation[8] issued by the Office of Price Administration.

§ 1315.1254 *Applicability of the General Maximum Price Regulation.*[9] The provisions of this Revised Price Schedule No. 87, as Amended, supersede the provisions of the General Maximum Price Regulation with respect to sales and deliveries for which maximum prices are established in this Schedule.

§ 1315.1255 *Less than maximum prices.* Lower prices than those set forth in Appendix A (§ 1315.1263) may be charged, demanded, paid or offered.

§ 1315.1256 *Adjustable pricing.* No person subject to the provisions of this Revised Price Schedule No. 87, as Amended, shall enter into any agreement permitting the adjustment of the prices of scrap rubber to prices which may be higher than the maximum prices, except that any person may offer or agree to adjust or fix prices to or at prices not in excess of the maximum prices in effect at the time of delivery. In an appropriate situation, where a petition for amendment or for adjustment or exception requires extended consideration, the Price Administrator may, upon application, grant permission to agree to adjust prices upon deliveries made during the pendency of the petition in accordance with the disposition of the petition.

§ 1315.1257 *Evasion.* The price limitations set forth in this Revised Price Schedule No. 87, as Amended, shall not be evaded whether by direct or indirect methods, in connection with an offer, solicitation, agreement, sale, delivery, purchase or receipt of or relating to scrap rubber, alone or in conjunction with any other commodity or by way of commission, service, transportation or other charge, or discount, premium or other privilege, or by tying-agreement or other trade understanding, or otherwise.

§ 1315.1258 *Records and reports.* (a) Every person making a sale or purchase of scrap rubber subject to this Revised Price Schedule No. 87, as Amended, after February 5, 1942, shall keep for inspection by the Office of Price Administration for a period of not less than one year complete and accurate records of (1) each such sale or purchase showing the date thereof, the name and address of the buyer and the seller, the price paid or received, and the quantity of each grade purchased or sold, and (2) the quantity of each grade of scrap rubber on hand and on order, as of the close of each calendar month.

(b) Such persons shall submit such reports to the Office of Price Administration and keep such other records in addition to or in place of the records required in paragraph (a) of this section as the Office of Price Administration may from time to time require or permit.

§ 1315.1259 *Enforcement.* (a) Persons violating any provision of this Revised Price Schedule No. 87, as Amended, are subject to the criminal penalties, civil enforcement actions, license suspension proceedings and suits for treble damages provided for by the Emergency Price Control Act of 1942.

(b) Persons who have evidence of any violation of this Revised Price Schedule No. 87, as Amended, or any price schedule, regulation or order issued by the Office of Price Administration or of any acts or practices which constitute such a violation, are urged to communicate with the nearest district, state or regional office of the Office of Price Administration or its principal office in Washington, D. C.

§ 1315.1260 *Petitions for amendment.* Persons seeking any modification of this Revised Price Schedule No. 87, as Amended, or an adjustment or exception not provided for therein may file petitions for amendment in accordance with the provisions of Procedural Regulation No. 1,[10] issued by the Office of Price Administration.

§ 1315.1261 *Definitions.* (a) When used in this Revised Price Schedule No. 87, as Amended, the term:

(1) "Person" includes an individual, corporation, partnership, association, or any other organized group of persons, or legal successor or representative of any of the foregoing, and includes the United States or any agency thereof, or any other government, or any of its political subdivisions, or any agency of any of the foregoing.

(2) "Scrap rubber" includes any waste or discarded rubber article or material usable for the production of reclaimed rub-

[1] Title 32—National Defense, Chapter XI—Office of Price Administration, Part 1315—Rubber and Products and Materials of Which Rubber is a Component.
[2] 7 F.R. 1369, 1836, 2000, 2132.
[3] 7 F.R. 658, 755.
[4] 6 F.R. 6455; reprinted, by order issued February 17, 1942, as Revised Price Schedule No. 56; 7 F.R. 1313.
[5] 7 F.R. 1201.
[6] 7 F.R. 1369.
[7] 7 F.R. 3403.
[8] 7 F.R. 3096, 3824, 4294.
[9] 7 F.R. 3153, 3330, 3666, 3990, 3991, 4339.
[10] 7 F.R. 971, 3663

ber or in the manufacture of any product.

(3) "Consumer" means any person consuming scrap rubber in the production of reclaimed rubber or in the manufacture of any product.

(4) "Ton" means a short ton of 2000 pounds net weight. Bags, coverings or containers shall not be included in the net weight.

(b) Unless the context otherwise requires, the definitions set forth in Section 302 of the Emergency Price Control Act of 1942 shall apply to other terms used herein.

§ 1315.1262 *Effective dates of amendments.* (a) This Revised Price Schedule No. 87, as Amended (§§ 1315.1251 to 1315.1263, inclusive) shall become effective June 26, 1942.

§ 1315.1263 *Appendix A: Maximum prices for scrap rubber—(a) Chief consuming centers.* The maximum prices listed in Tables 1, 2 and 3 for each consuming center are applicable to every sale of scrap rubber to any consumer for use in a consuming mill located in such consuming center, regardless of the place from which the scrap rubber may have been shipped or where the actual sale may have been made.

(b) *Other consuming mills.* (1) For any sale of scrap rubber of the kinds specified in Tables 1 and 2 to any consumer for use in a consuming mill not located in one of the consuming centers listed in Tables 1 and 2, the applicable maximum prices shall be those set forth in Tables 1 and 2 for the one of the consuming centers there listed to which the freight charge on scrap rubber from such consuming mill is lowest. If to any such consuming mill the freight charge on scrap rubber from two or more of the consuming centers listed in Tables 1 and 2 is equal, and it is not lower from any of the others, the maximum prices applicable to sales for consumption in such mill shall be the prices set forth in Tables 1 and 2 for the one of those consuming centers with equal freight rates whose maximum prices are lowest.

(2) For any sale of scrap rubber of the kinds specified in Table 3 to any consumer for use in a consuming mill not located in a consuming center, the applicable maximum prices shall be those set forth in Table 3.

(c) *Scrap rubber not meeting grade specifications.* The highest grade or quality of each kind of scrap rubber is defined by the specifications set forth in the footnotes to Tables 1, 2 and 3 of paragraph (a) of this section. All prices listed represent respectively the maximum prices for the highest grade or quality of each kind as so defined. The presence of one or more of the objectionable features specified in the respective grade or quality specifications shall be deemed to lower the quality of the particular kind of scrap rubber sold. Any sale of scrap rubber of lower quality than that specified in Tables 1, 2 or 3 for the respective kind shall be made at an appropriate differential, below the maximum price for that kind listed in Tables 1, 2 or 3 and commensurate with the difference in quality involved.

(d) *Delivered prices.* The prices specified in this Appendix are the maximum prices that may be paid by any consumer, or charged by any person, for scrap rubber sold to a consumer and delivered to the consumer's mill. The maximum prices set forth shall include all transportation costs. If the seller does not deliver the scrap rubber to the consumer's mill, the maximum prices shall be the maximum prices specified

TABLE 1. (DOLLARS PER SHORT TON)

Kind of Scrap Rubber	Maximum Prices at Consuming Centers						
	Akron, O.	Buffalo, N. Y.	Naugatuck, Conn.	East St. Louis, Ill.	Memphis, Tenn.	Gadsden, Ala.	Los Angeles, Calif.
Passenger Tires:[1]							
Mixed Passenger Tires[2]	$18.00	$17.50	$16.50	$16.40	$15.50	$14.00	$12.00
Beadless Passenger Tires[3]	24.00	23.50	22.12	22.00	20.88	19.00	16.50
Passenger S.A.G.[4]	18.50	18.00	17.00	16.90	16.00	14.50	12.50
Passenger Dykes[5]	24.00	23.50	22.12	22.00	20.88	19.00	16.50
Truck Tires:[6]							
Mixed Truck Tires[7]	18.00	17.50	16.50	16.40	15.50	14.00	12.00
Beadless Truck Tires[8]	24.00	23.50	22.12	22.00	20.88	19.00	16.50
Truck Dykes[9]	24.00	23.50	22.12	22.00	20.88	19.00	16.50
No. 1 Truck S.A.G.[10]	16.50	16.00	15.00	14.90	14.00	12.50	10.50
No. 2 Truck S.A.G.[11]	16.50	16.00	15.00	14.90	14.00	12.50	10.50
Solid Tires[12]	34.00	33.50	31.50	31.00	29.50	27.00	23.50

TABLE 1. SPECIFICATIONS

[1] *Passenger Tires.* Shall consist of whole pneumatic tire casings having six plies or less, and shall be free from hard, oxidized, burnt, filled, non-pneumatic, single tube and motorcycle tires, and from leather and metal.

[2] *Mixed Passenger Tires.* This kind shall consist of black whole tires free from strip tires. White or colored sidewall tires are permissible. A maximum of 10 % may consist of roadworn tires.

[3] *Beadless Passenger Tires.* This kind shall consist of *Mixed Passenger Tires* from which the beads have been cut, but which conform otherwise to the specifications for *Mixed Passenger Tires.*

[4] *Passenger S.A.G.* This kind shall consist of pieces of pneumatic passenger tires from which the treads and beads have been removed and may or may not contain sidewall rubber.

[5] *Passenger Dykes.* This kind shall consist of beadless passenger tires from which two or more layers of fabric have been removed.

[6] *Truck Tires.* Shall consist of whole pneumatic tires casings for buses and trucks having seven plies or more, and shall be free from hard, oxidized, burnt, filled, non-pneumatic single tube tires, and from leather and metal.

[7] *Mixed Truck Tires.* This kind shall consist of black whole tires free from stripped tires. White or colored sidewall tires are permissible. A maximum of 10 % may consist of roadworn tires.

[8] *Beadless Truck Tires.* This kind shall consist of *Mixed Tires* from which the beads have been cut, but which conform otherwise to the specifications for *Mixed Truck Tires.*

[9] *Truck Dykes.* This kind shall consist of beadless truck tires from which two or more layers of fabric have been removed.

[10] *No. 1 Truck S.A.G.* This kind shall consist of pieces of pneumatic bus and truck tires from which the tread and beads, but not the sidewall have been removed.

[11] *No. 2 Truck S.A.G.* This kind shall consist of a mixture of No. 1 *Passenger S.A.G.* with *No. 1 Truck S.A.G.* and may or may not contain sidewall rubber.

[12] *Solid Tires.* This kind shall consist of solid motor truck tires over 2½ inches in width free from oxidized tires, industrial truck tires, metal, hard bases, fiber bases and cloth bases.

TABLE 2. MAXIMUM PRICES AT CONSUMING CENTERS

Kind of Scrap Rubber	Akron, O.; Buffalo, N. Y.; East St. Louis, Ill.; Gadsden, Ala.; Memphis, Tenn.; Naugatuck, Conn.	Los Angeles, Calif.
	Dollars per Short Ton	
No. 1 Passenger Peelings[1]	$47.50	$40.00
No. 2 Passenger Peelings[2]	30.00	22.50
No. 3 Passenger Peelings[3]	27.50	20.00
No. 1 Truck Peelings[4]	47.50	37.50
No. 1 A Truck Peelings[5]	50.00	38.75
No. 2 Truck Peelings[6]	30.00	22.50
No. 3 Truck Peelings[7]	27.50	20.00
No. 1 Light Colored (Zinc) Carcass[8]	52.50	40.00
No. 2 Light Colored Carcass[9]	50.00	38.75
Gray Carcass[10]	47.50	37.50
Passenger Tubes:[11]	Cents per Pound	
No. 2 Passenger Tubes[12]	7¾	7¼
Light Colored No. 2 Passenger Tubes[13]	8¼	7¾
Red Passenger Tubes[14]	7½	7
Black Passenger Tubes[15]	6¾	6¼
Mixed Passenger Tubes[16]	6¾	6¼
Truck Tubes:[17]		
No. 2 Truck Tubes[18]	7½	7
Red Truck Tubes[19]	7¼	6¾
Black Truck Tubes[20]	5¼	4¾
Two-Toned Black-Gold Tubes[21]	6¾	6¼
Two-Toned Red-Black Tubes[22]	6½	6

TABLE 2. SPECIFICATIONS

[1] *No. 1 Passenger Peelings.* This kind shall consist of treads stripped from black pneumatic passenger tires. The material shall be free from fabric, metal, leather, and hard, burnt, or oxidized treads.

[2] *No. 2 Passenger Peelings.* This kind shall consist of treads stripped from black pneumatic passenger tires. The material may contain cushion rubber, breaker fabric and sidewalls plus no more than one full ply of carcass fabric.

[3] *No. 3 Passenger Peelings (Bald Head Peelings).* This kind is the same as No. 2 Passenger Peelings except that a part of the tread has been removed.

[4] *No. 1 Truck Peelings.* This kind shall consist of treads stripped from black pneumatic bus and truck tires. The material may contain cushion rubber, but shall be free from fabric, metal, leather, and hard, burnt, or oxidized treads. This grade may contain not more than 10 % of *No. 1 Passenger Peelings.*

[5] *No. 1 A Truck Peelings.* This kind shall have the same specifications as *No. 1 Truck Peelings* except these peelings shall be free from cushion rubber.

[6] *No. 2 Truck Peelings.* This kind shall consist of treads stripped from black pneumatic bus and truck tires. The material may contain cushion rubber, breaker fabric and sidewalls, but no more than one full ply of carcass fabric.

[7] *No. 3 Truck Peelings (Bald Head Peelings).* This kind is the same as *No. 2 Truck Peelings* except that a part of the tread has been removed.

[8] *No. 1 Light Colored Carcass.* This kind shall consist of all white zinc carcass free of black edges and any other colored rubber.

[9] *No. 2 Light Colored Carcass.* This kind shall consist of light colors as white, pink, light gray, pure gum and light brown carcass, free of all black edges and dark colored rubber.

[10] *Gray Carcass.* This kind shall consist of gray and colors too dark for delivery under *No. 2 Light Colored Carcass*, and shall be free of all black edges and black rubber.

[11] *Passenger Tubes.* Shall consist of inner tubes for pneumatic passenger tires, free from sections of tubes less than 12 inches long, free from truck, bus and puncture-proof tubes, crusty and oxidized tubes, and free from metal and punchings. All passenger tubes, except *Mixed Passenger Tubes*, shall be free from metal valves. All passenger tubes, except *Mixed Passenger Tubes* and *Black Passenger Tubes*, shall be free from black rubber valve cots and the bases of such valves.

[12] *No. 2 Passenger Tubes.* This kind shall consist of compounded passenger tubes free from black, red and two-toned passenger tubes.

[13] *Light Colored No. 2 Passenger Tubes.* This kind shall consist of *No. 2 Passenger Tubes* specially selected as to color by agreement between the buyer and the seller.

[14] *Red Passenger Tubes.* This kind shall be strictly RED tubes.

[15] *Black Passenger Tubes.* This kind shall be strictly black compounded passenger tubes. Black rubber valve cots and their bases may be present, but no metal valves or parts.

[16] *Mixed Passenger Tubes.* This kind shall consist of whole tubes of various colors and qualities and may contain valves unless otherwise specified in the purchase contract.

[17] *Truck Tubes.* Shall consist of inner tubes for

pneumatic truck and bus tires, free from sections of tubes less than 12 inches long, and free from crusty, oxidized or puncture-proof tubes, metal and punchings. All truck tubes, except *Mixed Truck Tubes*, shall be free from metal valves and from black rubber valve cots and the bases of such valves unless otherwise specified in the purchase contract.

[18] *No. 2 Truck Tubes.* This kind shall consist of compounded truck tubes free from black, red, and two-toned tubes.

[19] *Red Truck Tubes.* This kind shall be strictly RED tubes.

[20] *Black Truck Tubes.* This kind shall be strictly black compounded truck tubes. Black rubber valve cots and their bases may be present, but no metal valves and parts.

[21] *Two-Toned Black-Gold Tubes.* This kind shall be two-toned black and gold passenger or truck tubes.

[22] *Two-Toned Red-Black Tubes.* This kind shall be two-toned red and black passenger or truck tubes.

TABLE 3

Kind of Scrap Rubber	Maximum Prices at All Consuming Centers
	Dollars per Short Ton
Buffings[1]	$35.00
Bicycle Tires[2]	15.00
Passenger Tire Beads[3]	5.00
Truck Tire Beads[4]	7.00
Air Bags & Water Bags[5]	15.00
Air Brake Hose[6]	25.00
Miscellaneous Hose[7]	17.00
Mats & Matting[8]	15.00
Rubber Boots & Shoes[9]	33.00
No-Mark Soles & Trimmings[10]	35.00
Black Soles & Trimmings[11]	32.00
Rubber Heels[12]	16.00
Black Mechanical Scrap, above 1.10[13]	20.00
General Household & Industrial Scrap[14]	15.00
	Cents per Pound
Black Mechanical Scrap, 1.10 or below[15]	5
Light Colored Mechanical Scrap, 1.10 or below[16]	10
Light Colored Mechanical Scrap, 1.30 or below[17]	5
Light Colored Mechanical Scrap, 1.50 or below[18]	4½
Light Colored Mechanical Scrap, above 1.50[19]	4
White or Light Colored Friction Scrap, Unprocessed[20]	10
Black or Mixed Friction Scrap, Unprocessed[21]	6
White or Light Colored Friction Scrap, Processed[22]	12½
Black or Mixed Friction Scrap, Processed[23]	8½
Other Unvulcanized Scrap Rubber, White or Light Colored[24]	18
Other Unvulcanized Scrap Rubber, Black or Mixed[25]	9

TABLE 3. SPECIFICATIONS

[1] *Buffings.* This kind shall consist of buffings from tires or rubber stocks comparable in quality to tires, and shall be free from fabric, asbestos, buffing brush wires and other extraneous materials.

[2] *Bicycle Tires.* This kind shall consist of bicycle tires, with or without beads, and shall be free from oxidized tires and metal valves.

[3] *Passenger Tire Beads.* This kind shall consist of the beads of all motor car tires having six plies or less.

[4] *Truck Tire Beads.* This kind shall consist of the beads of all motor car tires having seven or more plies.

[5] *Air Bags & Water Bags.* This kind shall consist of air bags or water bags free from metal and free from burnt, cracked rubber.

[6] *Air Brake Hose.* This kind shall consist of railroad air brake hose and shall be free from steam hose or any other kind of hose.

[7] *Miscellaneous Hose.* This kind shall consist of all types of rubber hose except air brake hose and be free from metal, rags and rope.

[8] *Mats & Matting.* This kind shall consist of all types of rubber mats, matting, stair treads, and shall be free from metal, rags and rope.

[9] *Rubber Boots & Shoes.* This kind shall consist of rubber boots and shoes, arctics, and tennis shoes, including black, white or colored boots and shoes, cloth top shoes and gaiters, and light all-rubber gaiters. It shall be free from leather, any composite non-rubber material, metal and other extraneous materials.

[10] *No-Mark Soles & Trimmings.* This kind shall consist of rubber soles, and the trimmings from rubber soles, made from white or light colored stock, but shall be entirely free from black rubber stock, metal, leather, wood, and other extraneous materials.

[11] *Black Soles & Trimmings.* This kind shall consist of rubber soles, and the trimmings from rubber soles, made from black rubber stock and shall be free from metal, leather, wood, and other extraneous materials.

[12] *Rubber Heels.* This kind shall consist of rubber heels with or without nails, free from leather and wood.

[13] *Black Mechanical Scrap, above 1.10.* This kind shall consist of black rubber articles, free from fabric, metal, leather, wood and other extraneous materials and having a specific gravity above 1.10.

[14] *General Household & Industrial Scrap.* This kind shall consist of miscellaneous unsorted rubber articles collected from households or industrial mining, commercial or similar establishments.

[15] *Black Mechanical Scrap, 1.10 or below.* This kind shall consist of all forms of black rubber articles free from fabric, metal, wood, and other extraneous materials, and having a specific gravity of 1.10 or below.

[16] *Light Colored Mechanical Scrap, 1.10 or below.* This kind shall consist of all forms of white or light colored rubber articles free from fabric, metal, wood, and other extraneous materials, having a specific gravity of 1.10 or below.

[17] *Light Colored Mechanical Scrap, 1.30 or below.* This kind shall consist of all forms of white or light colored rubber articles free from fabric, metal, wood, and other extraneous materials, and having a specific gravity above 1.10 and not exceeding 1.30.

[18] *Light Colored Mechanical Scrap, 1.50 or below.* This kind shall consist of all forms of white or light colored rubber articles free from fabric, metal, wood, and other extraneous materials, and having a specific gravity above 1.30 and not exceeding 1.50.

[19] *Light Colored Mechanical Scrap above 1.50.* This kind shall consist of all forms of white or light colored rubber articles free from fabric, metal, wood, and other extraneous materials, and having a specific gravity of more than 1.50.

[20] *White or Light Colored Friction Scrap, Unprocessed.* This kind shall consist of white or light colored unvulcanized factory scrap containing fabric.

[21] *Black or Mixed Friction Scrap, Unprocessed.* This kind shall consist of black unvulcanized factory scrap containing fabric, but may include white or light colored unvulcanized factory scrap.

[22] *White or Light Colored Friction Scrap, Processed.* This kind shall be the same as No. 20, except that it must be processed in accordance with standard trade practice.

[23] *Black or Mixed Friction Scrap, Processed.* This kind shall be the same as No. 21, except that it must be processed in accordance with standard trade practice.

[24] *Other Unvulcanized Scrap Rubber, White or Light Colored.* This kind shall consist of white or light colored unvulcanized scrap rubber, free of fabric and free of all extraneous materials.

[25] *Other Unvulcanized Scrap Rubber, Black or Mixed.* This kind shall consist of black unvulcanized scrap rubber, free of fabric and free of all extraneous materials, but may include white or light colored unvulcanized scrap rubber.

in paragraphs (a), (b) and (c) of this section, less the lowest applicable published charges for transportation by rail, water or truck carrier to the consumer's mill, or if no such charges are published, the direct costs actually involved in transporting the scrap rubber to the consumer's mill.

(e) *Packing.* (1) The prices specified in this Appendix represent maximum prices for scrap rubber that is packed as follows:

(i) Mixed and beadless passenger and truck tires, solid rubber tires and bicycle tires may be shipped bundled or loose in cars.

(ii) All other kinds of scrap rubber shall be packed in bags or bales, with each kind packed separately. Each bale shall weigh not less than 500 pounds nor more than 1500 pounds and shall be well and securely bound.

(2) Any sale of scrap rubber not packed in accordance with the provisions of this paragraph must be made at appropriate differentials below the maximum prices specified in paragraphs (a), (b) and (c) of this section.

Issued this 26th day of June, 1942.

LEON HENDERSON
Administrator

Amendment No. 1

To avoid possible delay in the flow of scrap rubber to reclaiming plants, OPA on July 6, in Amendment No. 1 to the revised scrap price schedule, effective July 11, added another category, *Miscellaneous Inner Tubes*, to the kinds of scrap rubber under price ceilings applicable to sales to consumers. The maximum prices for this new grade are 6¢ a pound at all consuming centers except Los Angeles. In accordance with the ½¢ differential prevailing on all kinds of inner tubes between Los Angeles and other consuming centers, the maximum price at Los Angeles is 5½¢ a pound.

The flow of inner tubes to the Rubber Reserve Co. has been so heavy that it was feared the time needed for sorting into the customary classifications as set forth in Table 2 of Revised Price Schedule 87, as Amended, might cause delay in delivering scrap rubber to the reclaiming plants. For this reason the new category has been added.

Consumers can continue to obtain the classifications set forth in Revised Price Schedule 87, as Amended, but those needing scrap inner tubes immediately can now obtain them unsorted, OPA explained.

RUBBER SCRAP

SCRAP rubber, especially tires, was reported in better movement from normal trade sources as a result of recently increased prices. Collections from remote sources have increased substantially because the long-distance shipper has been assured by OPA Revised Price Schedule No. 87 of remunerative sales. Collections are expected to continue at a high rate for the next several months, and no slackening in demand is anticipated.

The Petroleum Industry War Council reported collection of 454,155 tons of scrap rubber in the nationwide drive ended July 10. Small additional tonnages are believed yet to be reported. A national salvage program directed by Lessing J. Rosenwald, chief of the Bureau of Industrial Conservation, WPB, began July 13. An important part of the drive is an intensified campaign to collect rubber and metals through regular trade channels. On June 26 the House Committee on Coinage, Weights, and Measures announced it was mailing 100,000 questionnaires to scrap and junk dealers, salvagers, and all large users of rubber requesting a certified inventory of their present rubber stocks.

Fixed Government Prices*

Plantation Grades

	Price Per Lb.
No. 1-X R.S.S. in cases	$0.22½
No. 1 Thin Latex Crepe	.23
No. 2 Thick Latex Crepe	.23
No. 1 Brown Crepe	.21
No. 2 Brown Crepe	.21
No. 2 Amber	.21
No. 3 Amber	.21
Rolled Brown	.17

*For a complete list of government prices see our June, 1942, issue, p. 254.

New York Market Rubber Quotations

		July 29, 1941	June 22, 1942		July 27, 1942	
		(Dollars and Cents)				
Latex						
Normal and concentrated (solid content)	lb.	.278	.2825	.29	.2825	.29
Paras †						
Upriver fine	lb.	.30	.....		.....	
Upriver fine	lb.	*.32	.....		.....	
Upriver coarse	lb.	.17	.....		.....	
Upriver coarse	lb.	*.23	.....		.....	
Islands fine	lb.	.29	.....		.....	
Islands fine	lb.	*.32	.....		.....	
Acre, Bolivian fine	lb.	.30	.....		.....	
Acre, Bolivian fine	lb.	*.32	.....		.....	
Beni, Bolivian fine	lb.	.30	.....		.....	
Madeira fine	lb.	.30	.....		.....	
Caucho †						
Upper ball	lb.	.17	.....		.....	
Upper ball	lb.	*.23	.....		.....	
Lower ball	lb.	.16½	.....		.....	
Pontianak						
Pressed block	lb.	.17	.26	‡		‡
Guayule						
Ampar	lb.	.15½	.....		.....	
Africans						
Rio Nuñez	lb.	.19	.225		.225	
Black Kassai	lb.	.19	.225		.225	
Prime Niger flake	lb.	.28	.35		.35	
Gutta Percha						
Gutta Siak	lb.	.20	.22	‡		
Gutta Soh	lb.	.29		‡		
Red Macassar	lb.	1.35	3.00		3.00	
Balata						
Block Ciudad Bolivar	lb.	.48	.50	‡		‡
Manaos block	lb.	.48		‡		‡
Surinam sheets	lb.	.49		‡		‡
Amber	lb.	.50		‡		‡

*Washed and dried crepe. Shipments from Brazil.
†These Brazilian rubbers have been taken over by the Rubber Reserve Co., and no prices have as yet been set.
‡None available at present.

Rims Approved and Branded by The Tire & Rim Association

Rim Size	June, 1942
15" and 16" D. C. Passenger	
16x4.00E	4,503
16x4.50E	2,747
16x5.50F	1,139
17" and over D. C. Passenger	
18x2.15B	16,809
Military	
16x4.50CE	61,402
16x6.50CS	47,141
20x6.00CT	4,598
Flat Base Truck	
80x3.75P (5")	2,979
20x3.75P (5")	1,412
24x4.33R (6")	23,636
15x4.33R (6")	123
20x5.00S (7")	10,453
18x5.00S (7")	281,743
20x6.00T (8")	10
22x6.00T (8")	51,268
18x6.00T (8")	3,441
21x7.33V (9/10")	1,103
20x7.33V (9/10")	17,636
22x7.33V (9/10")	434
24x7.33V (9/10")	1,637
19x8.37V (11")	114
20x8.37V (11")	2,729
24x8.37V (11")	221
20x10.00W	34
24x10.00W	856
Semi D. C. Truck	
16x4.50E	8,173
15x5.50F	477
16x5.50F	4,318
Tractor and Implement	
36x6.00S	61
24x8.00T	2,468
28x8.00T	318
36x8.00T	588
42x8.00T	29
Cast	
24x13.00	29
24x15.00	157
TOTAL	554,789

RECLAIMED RUBBER

A SUMMER seasonal drop in the call for reclaimed rubber was reported in July. The market was characterized as somewhat less active than in the months prior to governmental restrictions on the use of reclaim. An increased demand is expected within the next few months. The amount of whole-tire reclaim that can be obtained from the 454,155 tons of rubber scrap collected in the recent national drive depends upon what percentage of the total was tires, and that figure has not been made public. While this vast stockpile is said to contain an appreciable amount of miscellaneous items of doubtful value, it is expected that the supply on hand will be sufficient to keep reclaiming plants operating at near capacity levels for the better part of a year. Some reclaiming plants are not now working at 100% of capacity. Officials of the industry have stated that new facilities for reclaiming cannot be obtained because of the prevailing machinery bottleneck.

The Conservation division of the WPB reported that the ratio of reclaimed rubber (310,000 short tons) to total rubber consumption in 1941 was 21%.

Ceiling prices for reclaim follow:

New York Quotations

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7½/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Black	1.14-1.26	11¼/11½
Gray	1.15-1.26	12½/13¼
Red	1.15-1.32	12 /12¼
Miscellaneous		
Mechanical blends	1.25-1.50	4½/ 5½
White	1.35-1.50	13½/14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

New Incorporations

The Firehose Mfg. Co., 195 Rutherford Blvd., Clifton, N. J. Capital $50,000. H. B. Davis, D. H. Jackman, and C. M. Caldwell, Jr., all of 150 Broadway, New York, N. Y. Manufacture hose, belting, shafting, and tubing.

Gamaly Products, Inc., Los Angeles, Calif. Capital $75,000. M. Clifton. Deal in rubber and gutta percha as well as synthetic rubber.

Gulf Rubber & Plastics Co., Dallas, Tex. Capital stock $2,500. I. and R. E. Mitchell and B. J. Threadgill. Manufacturing.

Pioneer Rubber Mills, San Francisco, Calif. Filed by Hulbert, Helsell & Bettens, White Bldg., Seattle, Wash. Power of attorney to Weldon G. Bettens, 4314 Montfort Pl., Seattle.

Rotex Rubber Co., Inc., 100 Garfield Ave., Jersey City, N. J. Capital $10,000 consisting of 40 shares common stock, Class A, and 60 shares of common stock, Class B, all $100 a share par value, with $7,000 subscribed by incorporators. J. J. Hirschberger, 30 W. 89th St., New York, N. Y., 15 shares of Class A stock; L. Mayer, 2842 Grand Concourse, Bronx, N. Y., 20 shares Class A and 30 shares Class B; and E. Rosenberg, 100 Garfield Ave., Jersey City, five shares Class A.

Queens Rubber Heel Co., Inc., New York. Capital $10,000. Geo. E. Daniels, 36 W. 44th St., New York, N. Y. Wood, rubber, celluloid, and leather.

Royal Rubber Corp., New York, N. Y. Capital 100 shares, no par value. M. Blecher, Jr., 1501 Broadway, New York. Rubber products.

Synthetic Products, Inc., 310 Adams St., Newark, N. J. Capital $125,000. W. B. Laventure, R. L. Morgan, and R. H. Miner, all of 68 William St., New York, N. Y. Manufacture compounds, chemicals, and other products.

Victor Products Corp. of Pennsylvania, Gettysburg, Pa. Capital $50,000. R. J. and R. P. Funkhouser, Shephardstown, W. Va., and R. M. Hoffman, Gettysburg. Rubber products.

Amendment No. 8

(Continued from page 485)

(3) *Cable tape.* Compounds for manufacturing cable tape shall contain no crude rubber and not more than 30% by volume of rubber hydrocarbon (RHC) obtained by use of reclaimed rubber, and shall be applied only to one face.

(4) *Grounded neutral conductor.* No rubber, latex, reclaimed or scrap rubber shall be used as insulation on wire designed for the grounded neutral conductor, known as the "identified" or "white" wire of a 0-600 V A-C wiring system, including the service drop and service, the mains, feeders and branch circuit conductors up to the final outlet, but not including portable heavy duty or portable appliance service cords listed in subparagraphs (2) (iv) and (2) (v) above, nor the wires designed for lighting fixtures.

(5) *Jackets, belts and sheaths.* Rubber jackets, belts or sheaths shall not be used for mechanical protection in wire or cable except as provided in subparagraphs (2) (iv) and (2) (v) above.

(6) *Walls.* No insulated wire shall be manufactured or specified by any person with heavier walls than those provided by American Standards Association's standard; and required by the rating of the equipment serviced, except for non-leaded submarine cable.

(7) *Splicing tape and terminals.* Rubber compounds for splicing tape and termina's shall conform to specifications set forth in List 16 attached to Order M-15-b-1, except that compounds designed for tape for the following uses may be manufactured in the same quality as the insulation specified:

(i) For operating voltages in excess of 3000 volts.

(ii) For cables to be used in wet locations.

(iii) For operation at conductor temperatures of 70° C. or higher.

Rubber and Canvas Footwear Statistics

	Thousands of Pairs		
	Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940	11,129	57,278	62,480
1941	9,170	72,217	74,080
1942			
Jan.	8,315	5,545	6,300
Feb.	7,907	4,453	3,243
Mar.	6,803	4,479	5,247
Apr.	6,272	3,884	4,171
May	5,947	3,502	3,827

Source: *Survey of Current Business,* Bureau of Foreign & Domestic Commerce, Washington, D.C.

COMPOUNDING INGREDIENTS

THE July demand for compounding materials was reported to be less than normal in many types of rubber manufacture. Movement to plants was chiefly for rubber products for the armed forces and the war effort. Prices for most materials are generally steady at ceiling levels prescribed by the OPA Maximum Price Regulations.

CARBON BLACK. Although the current demand has slightly increased, deliveries are considerably below production. June shipments totaled about 28,000,000 pounds of the 33,216,000 pounds produced. Restrictions on oil production in Texas have cut black gas deliveries at some points, and it is believed that this will have the effect of reducing production to some extent. Sufficient output is indicated, however, to care for all anticipated needs. Industry stocks are reportedly higher than previously and will provide against possible contingencies.

CLAY. No change was reported in demand, which continues at a subnormal level.

DRY COLORS. Consumption is running considerably below levels reported earlier in the year. Maximum Price Regulation No. 180, issued July 16, permitted the return of the maximum price for chrome yellow, chrome green, molybdate orange, and zinc yellow color pigments to the April 1, 1942, level. The General Maximum Price Regulation had reduced the pigments by amounts varying from ¼ to ½¢ a pound. Only the four colors named in the order and all dry colors delivered in California, Oregon, and Washington are affected. Others remain under the over-all regulations. Prices are firm.

LITHARGE. The movement was light, but stocks have been maintained at a normal level. Prices are stable.

LITHOPONE. A fair demand was noted. Supplies are reportedly ample. Prices are steady.

RUBBER CHEMICALS. Compared with recent months, a slight increase in the call for rubber accelerators and antioxidants has been reported. WPB Conservation Order M-184, issued July 13, limits unrestricted deliveries of aniline to any one person to a total of 500 pounds a month. Supplies for September delivery must be requested before August 10.

Prices are generally unchanged.

RUBBER SOLVENTS. Demand from normal consumers was active, but war industries received the larger portion of the offerings. Stocks are said to be limited. Amendment No. 1 to General Preference Order No. M-150, issued July 11, restricts sales and deliveries of xylol and xylol aromatic materials to orders bearing preference ratings of A-2 or higher. S. Donald Perlman, salvage director of the Chemical and Textile Industries Salvage Section of the WPB Bureau of Industrial Conservation, recently urged reclamation of such solvents as alcohols, esters, ethers, ketones, hydrocarbons, and chlorinated compounds. Prices are firm.

TITANIUM PIGMENTS. Reportedly, 1942 demands by rubber manufacturers are estimated at about 10% of 1941 purchases. Prices are unchanged.

ZINC OXIDE. The call by the rubber trade continues at a fair rate, but below that of a year ago. Considering the quantity of crude available, the demand is somewhat better than would be expected as a result of heavier loading with black to conserve rubber, and increased production of types of compounds requiring greater amounts of zinc oxide. Amendment No. 1 to Maximum Price Regulation No. 166, issued July 9, changed the effective date of the order placing a maximum price of 7¢ a pound on zinc oxides containing 35% or more lead from June 22 to May 11, 1942. WPB Conservation Order No. M-38-j specifies that lead refiners shall set aside each month, beginning in July, 15% of the quantity of lead produced in the second preceding month. The July pool was 15% of May production. The lead pool had been stationary at 15% for the past several months.

Current Quotations*

Abrasives

Pumicestone, powdered	*lb.*	$0.035	/$0.04
Rottenstone, domestic	*lb.*	.025	

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	*ton*	25.00	
Litharge (commercial)	*lb.*	.09	
Magnesia, calcined, heavy	*lb.*		
technical, light	*lb.*	.0625/	.07

Accelerators, Organic

A-1	*lb.*	.26 /	.35
A-10	*lb.*	.36 /	.42
A-19	*lb.*	.52 /	.65
A-32	*lb.*	.60 /	.70
A-46	*lb.*	.50 /	.57
A-77	*lb.*	.42 /	.55
A-100	*lb.*	.42 /	.55
Accelerator 49	*lb.*		
808	*lb.*	.60 /	.62
833	*lb.*	1.15	
Acrin	*lb.*	.65	
Aldehyde ammonia	*lb.*	.65 /	.70
Altax	*lb.*	.43 /	.45
Arazate	*lb.*	1.53	
B-J-F	*lb.*	.38 /	.43
Beutene	*lb.*	.59 /	.64
Butasan	*lb.*	1.15	
Butazate	*lb.*	1.13	
Butyl Eight	*lb.*	.97 /	.99
C-P-B	*lb.*	1.95	
Captax	*lb.*	.38 /	.40
D-B-A	*lb.*	1.95	
Delac A	*lb.*	.39 /	.48
O	*lb.*	.39 /	.48
P	*lb.*	.39 /	.48
Di-Esterex-N	*lb.*	.50 /	.57
DOTG (Di-ortho-tolyguanidine)	*lb.*	.44 /	.46
DPG (Diphenylguanidine)	*lb.*	.36	
El-Sixty	*lb.*	.40 /	.47
Ethasan	*lb.*	1.13	
Ethazate	*lb.*	1.13	
Ethylideneaniline	*lb.*	.42 /	.43
Formaldehyde P.A.C.	*lb.*	.06 /	.0625
Formaldehyde-para-toluidine	*lb.*	.65	
Formaniline	*lb.*	.36 /	.37
Guantal	*lb.*	.40 /	.50
Hepteen	*lb.*	.34 /	.39
Base	*lb.*	1.25 /	1.40
Hexamethylenetetetramine U.S.P.	*lb.*	.39	
Technical	*lb.*	.33	
Lead oleate, No. 999	*lb.*	.14	
Witco	*lb.*	.15	
Ledate	*lb.*	1.48	
M-B-T	*lb.*	.38 /	.43
M-B-T-S	*lb.*	.43 /	.48
Methasan	*lb.*	1.23	
Methazate	*lb.*	1.23	
Monex	*lb.*	1.53	
Morfex "33"	*lb.*	.67 /	.72
"55"	*lb.*	.96 /	1.01
O-X-A-F	*lb.*	.38 /	.43
Oxynone	*lb.*	.77 /	.90
Para-nitroso-dimethylaniline	*lb.*	.85	
Pentex	*lb.*	.74 /	.84
Flour	*lb.*	.1225/	.1325
O	*lb.*		
Flour	*lb.*		
Phenex	*lb.*	.49 /	.54
Pipazate	*lb.*	1.53	
Pip-Pip	*lb.*	1.65	
R & H 50-D	*lb.*	.42 /	.43
Rotax	*lb.*	.48 /	.50
Safex	*lb.*	1.15 /	1.25
Santocure	*lb.*	.60 /	.67
Selenac	*lb.*	1.98	
SPDX	*lb.*	$0.69	/$0.74
A	*lb.*	.69 /	.74
Super sulphur No. 2	*lb.*	.13 /	.15
Tetrone A	*lb.*	2.20	
Thiocarbanilide	*lb.*	.28 /	.33
Thiofide	*lb.*	.43 /	.50
Thionex	*lb.*	1.53	
Thiotax	*lb.*	.38 /	.43
Thiurad	*lb.*	1.53	
Trimene	*lb.*	.54 /	.64
Base	*lb.*	1.03 /	1.18
Triphenylguanidine (TPG)	*lb.*	.45	
Tuads, Methyl	*lb.*	1.53	
2-MT	*lb.*	.75	
Ulto	*lb.*	.99 /	1.04
Ureka	*lb.*	.50 /	.57
Blend B	*lb.*	.50 /	.57
C	*lb.*	.48 /	.55
Vulcanex	*lb.*	.42 /	.43
Z-B-X	*lb.*	2.45	
Zenite	*lb.*	.40 /	.42
A	*lb.*	.45 /	.47
B	*lb.*	.42 /	.44
Zimate, Butyl	*lb.*	1.13	
Ethyl	*lb.*	1.13	
Methyl	*lb.*	1.23	
Zipacel	*lb.*	1.65	

Activators

Aero Ac 50	*lb.*		
Barak	*lb.*	.50	
MODX	*lb.*	.295 /	.345
SL No. 20	*lb.*	.1089/	.1135

Age Resisters

AgeRite Alba	*lb.*	1.95 /	2.05
Gel	*lb.*	.56 /	.58
Hipar	*lb.*	.64 /	.66
Powder	*lb.*	.48 /	.50
Resin	*lb.*	.48 /	.50
D	*lb.*	.48 /	.50
White	*lb.*	1.23 /	1.33
Albasan	*lb.*	.69 /	.74
Aminox	*lb.*	.48 /	.57
Antox	*lb.*	.54 /	.56
Betanox	*lb.*	.48 /	.57
B-L-E	*lb.*	.48 /	.57
Powder	*lb.*	.64 /	.73
B-X-A	*lb.*	.48 /	.57
Copper Inhibitor X-872-A	*lb.*	1.15	
Flectol H	*lb.*	.48 /	.55
White	*lb.*	.80 /	1.00
M-U-F	*lb.*	1.48	
Neozone (standard)	*lb.*	.61 /	.63
A	*lb.*	.48 /	.50
C	*lb.*	.48 /	.50
D	*lb.*	.48 /	.50
E	*lb.*	.61 /	.63
Oxynone	*lb.*	.77 /	.90
Permalux	*lb.*	1.18 /	1.20
Santoflex B	*lb.*	.48 /	.55
BX	*lb.*	.57 /	.64
Santovar A	*lb.*	1.15 /	1.40
Stabilite	*lb.*	.48 /	.69
Alba	*lb.*	.50 /	.74
Thermoflex A	*lb.*	.64 /	.66
C	*lb.*	.58 /	.60
Tysonite	*lb.*	.16 /	.165
V-G-B	*lb.*	.48 /	.57

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70 /	3.55
liquid, 50%	100 *lbs.*	1.95	
solid (700-*lb. drums*)	100 *lbs.*	2.30 /	3.15

Antiscorch Materials

Antiscorch T	*lb.*	.90	
Cumar RH	*lb.*	.105	
E-S-E-N	*lb.*	.34 /	.39
R-17 Resin (*drums*)	*lb.*	.1075	
RM	*lb.*	1.25	
Retarder W	*lb.*	.36	
Retardex	*lb.*	.445 /	.475
U-T-B	*lb.*	.34 /	.39

Antisun Materials

Heliozone	*lb.*	.23 /	.24
S.C.R.	*lb.*	.32 /	.34
Sunproof	*lb.*	.2275/	.2775
Jr.	*lb.*	.165 /	.215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	*lb.*		
Unicel	*lb.*	.50	

Brake Lining Saturant

B.R.T. No. 3	*lb.*	.0175/	.0185

Colors

Black

Du Pont powder	*lb.*	.42	
Lampblack (commercial), *l.c.l.*	*lb.*	.15	

Blue

Du Pont Dispersed	*lb.*	.35 /	3.95
Powders	*lb.*	2.25 /	3.75
Heliogen BKA	*lb.*		
Toners	*lb.*		

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of known ingredients. Requests for information not recorded will receive prompt attention.

Brown

Mapico	lb	$0.11	

Green

Chrome	lb.	.25	
oxide (*freight allowed*)	lb.	.24	
Du Pont Dispersed	lb.	.98	/$2.85
Powders	lb.	1.00	
Guignet's (*bbls.*)	lb.	.70	
Toners	lb.		

Orange

Du Pont Dispersed	lb.	.88	/ 2.35
Powders	lb.	2.75	/ 3.05
Toners	lb.		

Orchid

Toners	lb.		

Pink

Toners	lb.		

Purple

Toners	lb.		

Red

Antimony			
Crimson, 15/17%	lb.		
R. M. P. No. 3	lb.	.48	
Sulphur free	lb.		
R.M.P.	lb.	.52	
Golden 15/17%	lb		
7-A	lb.	.37	
Z-2	lb.	.25	
Cadmium, light (400-*lb. bbls.*)	lb.	.80	/ .85
Du Pont Dispersed	lb.	.93	/ 2.05
Powders	lb.	.60	/ 1.65
Iron Oxide, *l.c.l.*	lb.		
Mapico	lb.	.0975	
Rub-Er-Red (*bbls.*)	lb.	.0975	
Toners	lb.		

White

Lithopone (*bags*)	lb.	.0425/	.045
Albalith	lb.	.0425/	.045
Astrolith (50-*lb. bags*)	lb.	.0425/	.045
Azolith	lb.	.0425/	.045
Titanium Pigments			
Ray-bar	lb.	.055 /	.065
Ray-cal	lb.	.0525/	.0625
Rayox	lb.	.135 /	.165
Titanolith (50-*lb. bags*)	lb.	.056 /	.0585
Titanox-A	lb.	.145 /	.175
B	lb.	.0575/	.0625
30	lb.	.0575/	.0625
C	lb.	.055 /	.06
M	lb.	.0575/	.0625
RC	lb.	.055 /	.06
RC-HT	lb.	.055 /	.06
Ti-Tone	lb.		
Zopaque (50-*lb. bags*)	lb.	.145 /	.1525
Zinc Oxide			
Azo ZZZ-11	lb.	.0725/	.075
44	lb.	.0725/	.075
55	lb.	.0725/	.075
66	lb.	.095 /	.0975
French Process, Florence			
Green Seal-8	lb.	.09 /	.0925
Red Seal-9	lb.	.085 /	.0875
White Seal-7	lb.	.095 /	.0975
Kadox, Black Label-15	lb.	.0725/	.075
No. 25	lb.	.085 /	.0875
72	lb.	.0725/	.075
Red Label-17	lb.	.0725/	.075
Horse Head Special 3	lb.	.0725/	.075
XX Red-4	lb.	.0725/	.075
23	lb.	.0725/	.075
72	lb.	.0725/	.075
78	lb.	.0725/	.075
80	lb.	.0725/	.075
103	lb.	.0725/	.075
110	lb.	.0725/	.075
St. Joe (lead free)			
Black Label	lb.	.0725/	.075
Green Label	lb.	.0725/	.075
Red Label	lb.	.0725/	.075
U.S.P.	lb.	.105 /	.1075
Zinc Sulphide Pigments			
Cryptone-BA-19	lb.	.056 /	.0585
BT	lb.	.056 /	.0585
CB	lb.	.056 /	.0585
MS	lb.	.0575/	.06
ZS No. 20	lb.	.0825/	.085
86	lb.	.0825/	.085
230	lb.	.0825/	.085
800	lb.	.0825/	.085
Sunolith	lb.	.0425/	.045

Yellow

Cadmolith (cadmium yellow), (400-*lb. bbls.*)	lb.	.55 /	.60
Du Pont Dispersed	lb.	1.25 /	1.85
Powders	lb.	.70 /	1.75
Mapico	lb.	.0725	
Toners	lb.		

Dispersing Agents

Bardex	lb.	.0425/	.045
Bardol	lb.	.025 /	.0275
B	lb.	.05 /	.0525
Darvan No. 1	lb.	.30 /	.34
No. 2	lb.	.30 /	.34
No. 3	lb.	.30 /	.34
Nevoll (*drums, c.l.*)	lb.	.0225	
Santomerse S	lb.	.11 /	.25

Extenders

Extendex C	lb.		
Naftolen	lb.	.15 /	.20
"600" A	lb.		
B	lb.		
Vanzak	gal.	.05 /	.06

Fillers, Inert

Asbestine, *c.l.*	ton	$20.00	
Asbestos Fiber	ton	15.50	$48.00
Barytes	ton	40.00	
f.o.b., St. Louis (50-*lb. paper bags*)	ton	25.55	
off color, domestic	ton	29.00	
white, domestic	ton	38.50	
Blanc fixe, dry, precip	ton	80.00	
Calcene	ton	37.50	/43.00
Infusorial earth	lb.	.0225	
Kalite No. 1	ton	26.00	
3	ton	36.00	
Kalvan	ton	100.00	
Magnesium Carbonate, *l.c.l.*	lb.	.0725	
Paradene No. 2 (*drums*)	lb.	.0525	
Pyrax A	ton	7.50	
Whiting			
Columbia Filler	ton	9.00	/14.00
Suprex White	ton	32.50	
Witco, *c.l.*	ton	8.00	
Witcarb	lb.		

Finishes

Black-Out (surface protective)	gal.	4.50	/ 5.00
Mica, *l.c.l.*	ton		
Rubber lacquer, clear	gal.	1.00	/ 2.00
colored	gal.	2.00	/ 3.50
Shoe varnish	gal.	1.45	
Talc	ton	25.00	

Flock

Cotton flock, dark	lb.	.085 /	.11
dyed	lb.	.45 /	.80
white	lb.	.12 /	.19
Rayon flock, colored	lb.	.85 /	1.25
white	lb.	.75 /	1.00

Latex Compounding Ingredients

Accelerator 552	lb.	1.65	
Aerosol OT Aqueous 10%	lb.		
Antox, dispersed	lb.	.54	
Aquarex D	lb.	.75	
F	lb.	.85	
MDL Paste	lb.	.25	
Areskap No. 50	lb.	.18	/ 0.24
100, dry	lb.	.39	/ .51
Aresket No. 240	lb.	.16	/ .22
300, dry	lb.	.42	/ .50
Aresklene No. 375	lb.	.35	/ .50
400 dry	lb.	.51	/ .65
Black No. 25, dispersed	lb.	.22	/ .40
Casein	lb.		
Collocarb	lb.	.07	
Color Pastes, dispersed	lb.	.75	/ 1.10
Copper Inhibitor X-872	lb.	2.25	
Dispersex No. 15	lb.	.11	/ .12
No. 20	lb.	.08	/ .10
Factex Dispersion A	lb.	.17	
Heliozone, dispersed	lb.	.25	
MICRONEX, Colloidal	lb.	.06	/ .07
R-2 Crystals	lb.	1.55	/ 1.70
S-1 (400-*lb. drums*)	lb.	.65	
Santobrite Briquettes	lb.		
Powder	lb.		
Santomerse D	lb.	.41	/ .65
S	lb.	.11	/ .25
Sodium Stearate	lb.	.40	
Stablex A	lb.	.90	/ 1.10
B	lb.	.70	/ .90
C	lb.	.40	/ .50
Sulphur, dispersed	lb.	.10	/ .15
No. 2	lb.	.08	/ .12
T-1 (440-*lb. drums*)	lb.	.40	
Tepidone	lb.	.63	
Tetrone A	lb.	2.20	
Tysonite, dispersed	lb.	.32	/ .35
Zenite Special	lb.	.47	
Zinc oxide, dispersed	lb.	.12	/ .15

Mineral Rubber

Black Diamond, *l.c.l.*	ton	25.00	/30.00
B.R.C. No. 20	lb.	.0105/	.0115
Hydrocarbon, Hard	lb.	25.00	/27.00
MilliMar	lb.	.055	
Parmr	ton		
Pioneer, *c.l.*	lb.	25.00	/27.00
285°-300°	ton	25.00	/27.00

Mold Lubricants

Aluminum Stearate	lb.	.21 /	.24
Aquarex D	lb.	.75	
MDL Paste	lb.	.25	
Colite	gal.	.90 /	1.15
Lubrex	lb.	.25 /	.30
Mold Paste	lb.	.12 /	.30
Rubber-Glo, conc. regular	gal.	.94 /	1.15
Type W	gal.	.99 /	1.20
Sericite	ton	65.00	
Soapstone, *l.c.l.*	ton	22.50	
Zinc Stearate	lb.	.28 /	.31

Oil Resistant

A-X-F	lb.	.82 /	.85

Reclaiming Oils

B.R.V.	lb.	.035 /	.0375
C-10	gal.	.19 /	.24
D-4	gal.	.17 /	.22
E-5	gal.	.15 /	.20
No. 1621	lb.	.021 /	.0235
S.R.O.	lb.	.02 /	.0225
Type C (for synthetic rubber)	gal.	.33 /	.38
X-443	gal.	$0.29	

Reenforcers

Carbon Black			
Aerfloted Arrow Specification (*bags only*)	lb.	.0355†	
Arrow Compact Granulized	lb.	.0355†	
Certified Heavy Compressed (*bags only*)	lb.	.0355†	
Spheron	lb.	.0355†	
Channel "S"	lb.	.12	
Continental, dustless	lb.	.0355†	
"AA"	lb.		
Compressed (*bags only*)	lb.	.0355†	
Disperso	lb.	.0355†	
Dixie	lb.	.0355†	
Dixiedensed	lb.	.0355†	
66	lb.	.0355†	
Furnex	le.	.035	
Beads	lb.	.035	
Gastex	lb.	.035	/$0.06
HX	lb.	.0355†	
Kosmobile	lb.	.0355†	
66	lb.	.0355†	
Kosmos	lb.	.0355†	
Dixie 20	lb.	.035†	
MICRONEX Beads	lb.	.0355†	
Mark II	lb.	.0355	
Standard	lb.	.0355	
W-5	lb.	.0355	
W-6	lb.	.0355	
P-33	lb.	.0475	
Pelletex	lb.	.035 /	.06
Thermax	lb.	.0225	
"S"	lb.	.0675	
TX	lb.	.0355†	
Velvetex	lb.	.04 /	.06
"WYEX BLACK"	lb.	.0355†	
Carbonex Flakes	lb.	.03 /	.035
S	lb.	.031 /	.036
Plastic	lb.	.031 /	.0335
Clays			
Aerofloted Hi-White	ton	11.00	
LGB	ton	15.00	
Paragon (50-*lb. bags*)	ton	10.00	
Suprex (50-*lb. bags*)	ton	11.00	/23.50
Catalpo, *c.l.*	ton	30.00	
China	ton	25.00	
Dixie	ton	11.00	
"L"	ton		
Langford	ton	8.50	
McNamee	ton	10.00	
Par	ton	11.00	
Paraforce, *c.l.*	ton	50.00	
Witco, *c.l.*	ton	10.00	
Cumar EX	lb.	.05	
MH	lb.	.065 /	.115
V	lb.	.095 /	.125
465 Resin	lb.		
"G" Resin	lb.		
Nevindene	lb.		
Silene	lb.	.04 /	.045

Reodorants

Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Curodex 19	lb.		
188	lb.		
198	lb.		
Rodo No. 0	lb.	4.00 /	4.50
10	lb.	5.00 /	5.50

Rubber Substitutes

Black	lb.	.085 /	.13
Brown	lb.	.085 /	.1375
White	lb.	.09 /	.15
Factice			
Amberex Type B	lb.	.1875	
Brown	lb.	.085 /	.1375
Fac-Cel B	lb.	.15	
C	lb.	.15	
Neophax A	lb.	.165	
B	lb.	.165	
White	lb.	.09 /	.15

Softeners and Plasticizers

B.R.T. No. 7	lb.	.02 /	.021
Bondogen	lb.	.98 /	1.05
Bunnatol (for synthetic rubber)	lb.	.40 /	.50
Burgundy pitch	lb.		
Copene Resin	lb.	.32	
Cycline oil	gal.	.14 /	.20
Dipolymer Oil	gal.	.33 /	.38
Dispersing Oil No. 10	lb.	.0375/	.04
LX-436 (*tank car*)	lb.	.027	
Myristilene	lb.	.20 /	.30
Nevinol	lb.	.13 /	.14
No. 480 Resin	lb.		
Nuba resinous pitch (*drums*)			
Grades No. 1 and No. 2	lb.	.029	
3-X	lb.	.0425	
Nypene Resin	lb.	.32	
Palm oil (Witco), *c.l.*	lb.		
Palmalene	lb.	.15 /	.25
Palmol	lb.	.16	
Para Flux (reg.)	gal.	.17 /	.18
No. 2016	gal.	.135 /	.19
Para Lube	lb.	.046 /	.048

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

Paradene No. 1 (*drums*)	*lb.*	$0.0525
Special (*drums*)		
20 to 35° C. M.P.	*lb.*	.0625
35 to 45° C. M.P.	*lb.*	.0625
45 to 75° C. M.P.	*lb.*	.0575
Piccocizer "30"	*lb.*	
Piccolyte Resins	*lb.*	.15 /$0.185
Piccoumaron Resins	*lb.*	.045 / .15
Pictar	*gal.*	
Pine tar	*gal.*	
Oil	*gal.*	
Plastogen	*lb.*	.0775/ .08
Plastone	*lb.*	.27 / .30
R-19 Resin (*drums*)	*lb.*	.1075
21 Resin (*drums*)	*lb.*	.1075
Reogen	*lb.*	$0.115 /$0.12
RPA No. 2	*lb.*	.65
3	*lb.*	.46
4	*lb.*	.80
Tackol	*lb.*	.085 / .18
Tarzac	*lb.*	.23 / .24
Tonox	*lb.*	.50 / .59
Witco No. 20, *l.c.l.*	*gal.*	.20
X-1 resinous oil (*tank car*)	*lb.*	.011
XX-100 Resin	*lb.*	

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	*lb.*	.015 / .016
60°C. M.P.	*lb.*	.015 / .016
75°C. M.P.	*lb.*	.015 / .016

Solvents

Beta-Trichlorethane	*lb.*	$0.20
Carbon Bisulphide	*lb.*	
Tetrachloride	*gal.*	
Cosol No. 1	*gal.*	.26
No. 2	*gal.*	.25
No. 3	*gal.*	.22
Industrial 90% benzol (*tank car*)	*gal.*	.15
Picco	*gal.*	.22 /$0.32
Skellysolve	*gal.*	

(*Continued on page* 514)

Tire and Tube Quotas for July and August, 1942†

Region	State	JULY: Passenger, Motorcycle, Tires and Tubes — New Tires Class A For Release on July 1	New Tires Class B* For Release on July 15	Recaps For Release on July 1	New Tubes For Release on July 1	JULY: Truck, Bus, Farm Tractor, Implement, Etc., Tires and Tubes — New Tires For Release on July 1	Recaps For Release on July 1	New Tubes For Release on July 1	AUGUST: Passenger and Motorcycle, Etc. — New Tires Class "A" Eligibles	New Tires Grade II Class "B" Eligibles War Workers Only	Recaps Classes "A" & "B" Eligibles	New Tubes Classes "A" & "B" Eligibles	AUGUST: Truck, Bus, Farm Tractor, Implement, Etc. — New Tires Class "A" Eligibles	Recaps Classes "A" & "B" Eligibles	New Tubes Classes "A" & "B" Eligibles
No. 1	Maine	289	114	2,746	1,601	1,959	2,313	2,190	289	418	3,030	1,996	2,330	2,974	2,743
	New Hampshire	203	86	2,074	1,201	986	1,349	1,197	226	313	2,273	1,502	1,116	1,435	1,319
	Vermont	141	53	1,284	752	887	1,042	989	150	195	1,410	938	1,120	1,420	1,313
	Massachusetts	1,722	915	22,074	12,562	6,330	8,287	7,493	1,410	3,336	24,148	15,436	5,856	5,997	6,129
	Rhode Island	323	175	4,224	2,401	1,182	1,389	1,318	198	641	4,646	2,930	1,076	946	1,046
	Connecticut	822	859	20,704	11,378	3,626	4,267	4,046	758	3,104	22,478	14,072	3,683	4,552	4,259
BOSTON	SUB-TOTAL	3,500	2,202	53,106	29,895	14,970	18,647	17,233	3,013	8,007	57,985	36,874	15,181	17,324	16,809
No. 2	New York City	1,688	381	9,194	5,726	5,884	7,741	6,984	1,688	4,413	31,962	20,335	7,815	9,751	9,084
	New York (not N. Y. C.)	3,163	1,300	31,376	18,219	11,119	14,513	13,139	3,163	4,766	34,504	22,669	14,462	18,491	17,041
	New Jersey	1,666	1,228	29,618	16,526	6,509	8,496	7,692	1,694	4,406	31,902	20,270	8,663	11,035	10,186
	Pennsylvania	3,924	2,286	55,127	31,180	15,282	17,944	17,032	3,848	7,447	53,953	34,858	18,560	23,618	21,811
	Delaware	125	51	1,232	716	612	717	681	123	185	1,340	880	741	945	872
	Maryland	846	434	10,475	5,975	3,987	4,154	4,173	998	1,576	11,408	7,470	4,656	4,000	4,476
	Dist. of Columbia	387	88	2,743	1,636	1,133	1,331	1,263	142	302	2,934	1,805	1,300	896	1,136
NEW YORK	SUB-TOTAL	11,799	5,768	139,765	79,978	44,526	54,896	50,964	11,596	23,095	168,003	108,287	56,197	68,736	64,606
No. 3	Ohio	2,764	1,948	46,991	26,282	14,411	19,739	17,505	3,284	7,068	51,199	32,883	13,692	17,500	16,130
	Kentucky	773	259	5,081	3,107	4,070	4,768	4,530	758	811	5,874	3,976	5,029	6,344	5,881
	West Virginia	583	205	4,936	2,910	3,414	4,025	3,813	572	765	5,532	3,670	4,239	5,400	4,985
	Michigan	2,791	1,905	46,034	25,788	7,999	9,420	8,929	2,856	6,918	50,105	31,990	10,570	13,308	12,348
	Indiana	1,625	1,003	24,173	13,624	8,339	10,419	9,615	1,795	3,675	26,600	17,133	10,007	9,836	10,261
CLEVELAND	SUB-TOTAL	8,536	5,320	127,215	71,711	38,233	48,371	44,392	9,265	19,237	139,310	89,652	43,537	52,388	49,605
No. 4	Virginia	985	538	12,971	7,368	5,214	6,302	5,903	966	1,927	14,080	9,068	7,023	8,621	8,090
	North Carolina	1,342	282	6,824	4,294	6,919	7,792	7,541	1,455	1,169	8,493	5,939	8,708	10,768	10,072
	South Carolina	686	162	3,914	2,421	3,147	3,700	3,510	743	624	4,516	3,143	3,818	4,880	4,498
	Georgia	1,429	312	6,042	3,956	6,982	11,378	9,411	1,509	1,012	7,334	5,265	8,193	9,605	9,204
	Florida	1,150	246	5,940	3,729	6,340	7,253	6,968	1,246	1,006	7,285	5,095	7,661	9,559	8,905
	Tennessee	970	323	7,788	4,616	5,281	5,943	5,753	1,049	1,252	9,063	6,071	6,528	8,046	7,537
	Alabama	768	387	9,336	5,333	5,098	5,997	5,687	832	1,425	10,317	6,718	6,402	7,957	7,425
	Mississippi	484	123	2,376	1,517	3,990	4,646	4,427	524	426	3,096	2,161	4,874	6,070	5,587
ATLANTA	SUB-TOTAL	7,814	2,373	55,191	33,234	42,971	53,011	49,200	8,324	8,841	64,184	43,460	53,207	65,506	61,318
No. 5	Missouri	1,586	459	11,079	6,672	7,643	10,662	9,383	1,608	1,693	12,248	8,307	9,569	12,237	11,276
	Kansas	1,011	261	5,761	3,575	6,056	7,113	6,750	992	905	6,557	4,516	6,193	7,910	7,293
	Oklahoma	1,505	220	5,305	3,574	6,425	5,605	6,167	1,517	914	6,628	4,840	6,568	5,308	6,141
	Arkansas	439	124	2,388	1,500	3,917	4,590	4,361	476	418	3,041	2,102	4,862	6,148	5,694
	Texas	4,620	793	17,731	11,765	21,164	17,811	19,979	4,793	3,084	22,357	16,152	24,281	19,493	22,637
	Louisiana	707	197	4,384	2,688	5,416	6,367	6,040	766	712	5,151	3,541	6,541	8,335	7,693
DALLAS	SUB-TOTAL	9,868	2,054	46,648	29,774	50,621	52,148	52,680	10,152	7,726	55,982	39,458	58,014	59,431	60,734
No. 6	Illinois	2,183	1,505	36,314	20,335	13,117	12,302	13,030	2,622	5,468	39,585	25,470	16,136	12,062	14,582
	Iowa	1,346	311	7,508	4,659	5,325	6,272	5,945	1,167	1,143	8,267	5,651	7,153	3,886	5,709
	Nebraska	487	157	3,227	1,968	2,878	2,102	2,553	531	543	3,937	2,677	3,553	2,963	3,328
	North Dakota	234	58	955	634	1,209	578	916	261	148	1,063	786	1,393	662	1,063
	South Dakota	286	80	1,252	822	1,614	1,779	1,738	298	230	1,701	1,191	1,976	2,457	2,292
	Minnesota	1,143	277	6,692	4,124	4,707	5,538	5,252	1,294	1,038	7,507	5,256	5,869	7,445	6,885
	Wisconsin	1,042	529	12,750	7,280	5,091	7,349	6,377	1,122	1,964	14,231	9,251	5,702	5,349	5,715
CHICAGO	SUB-TOTAL	6,721	2,917	68,698	39,822	33,941	35,920	35,811	7,295	10,534	76,291	50,282	41,782	34,824	39,574
No. 7	Montana	349	99	1,729	1,107	1,688	3,201	2,506	353	278	2,013	1,413	2,177	2,221	2,274
	Idaho	238	67	1,159	745	1,804	2,121	2,012	260	192	1,387	982	2,109	2,655	2,464
	Wyoming	130	40	758	472	1,124	1,300	1,242	142	127	918	634	1,265	1,594	1,478
	Colorado	652	220	5,328	3,151	3,611	4,177	3,992	674	880	6,381	4,239	4,485	3,785	4,277
	Utah	308	108	2,272	1,366	1,786	3,297	2,606	336	356	3,067	2,008	2,074	2,488	2,359
	New Mexico	372	68	1,464	968	1,617	1,427	1,560	369	240	1,742	1,256	2,189	1,858	2,093
DENVER	SUB-TOTAL	2,049	602	12,710	7,809	11,630	15,523	13,918	2,134	2,073	15,508	10,532	14,299	14,601	14,945
No. 8	Washington	862	350	8,441	4,907	4,835	5,682	5,391	940	1,367	9,904	6,524	5,486	7,005	6,459
	Oregon	717	212	5,108	3,069	4,201	4,916	4,673	782	838	6,078	4,113	4,852	6,170	5,700
	Northern California	1,803	625	15,064	8,891	9,062	10,734	10,146	1,967	2,405	17,418	11,641	10,619	13,534	12,490
	Southern California	2,820	825	19,931	11,983	9,426	11,013	10,478	2,165	3,199	23,162	15,240	8,607	11,132	10,208
	Nevada	103	30	708	427	961	1,008	1,009	112	117	852	578	1,114	1,237	1,216
	Arizona	314	80	1,911	1,172	2,378	2,501	2,501	342	346	2,569	1,740	2,536	3,340	3,039
SAN FRANCISCO	SUB-TOTAL	6,619	2,122	51,163	30,449	30,863	35,854	34,198	6,308	8,272	59,983	39,836	33,214	42,418	39,112
No. 9	Puerto Rico	70	11	476	284	798	380	604	77	46	585	378	889	497	717
	Virgin Islands	5	1	21	14	38	28	34	5	4	25	18	52	7	31
	Canal Zone	22	4	84	56	101	118	112	24	14	103	75	119	151	140
	Alaska	94	28	—	61	233	—	119	97	11	—	58	204	—	105
WASHINGTON, D. C.	SUB-TOTAL	191	44	581	415	1,170	526	869	203	75	713	529	1,264	655	993
TOTAL U. S. & TERRITORIES (Excl. Reserves)		57,097	23,402	555,077	323,087	268,925	314,896	299,265	58,308	87,860	637,959	418,910	316,695	355,883	347,696

*Passenger tires for Class B eligibles (war workers only) to be released for distribution July 15. Those eligible in Class B for new tires are entitled only to Grade II tires.

†The quotas listed do not include reserves.

COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	May 30	June 27	July 4	July 11	July 18	July 25
July	19.02	18.18	18.98	19.12	....	....
Aug.	....	18.33	19.12	19.23	18.54	18.39
Sept.	19.20	18.47	19.26	19.33	18.67	18.51
Dec.	19.45	18.76	19.49	19.51	18.90	18.78
Mar.	19.61	18.93	19.70	19.60	18.97	18.92
May	19.71	19.02	19.80	19.65	19.03	19.00
July	....	....	....	....	19.09	19.04

New York Quotations

June 24, 1942

Drills

38-inch 2.00-yard	yd.	$0.21½
40-inch 1.45-yard		.29¾
50-inch 1.52-yard		.31⅝
52-inch 1.85-yard		.25⅞
52-inch 1.90-yard		.25¼
52-inch 2.20-yard		.21477
52-inch 2.50-yard		.194
59-inch 1.85-yard		.25

Ducks

38-inch 2.00 yard D. F.	.21½	.22⅝
40-inch 1.45-yard S. F.		.29¾
51½-inch 1.35-yard D. F.		.33½
72-inch 1.05-yard D. F.	.43	.45
72-inch 17-21 ounce		.48⅞

Mechanicals

Hose and belting	lb.	.42¾

Tennis

51½-inch 1.35-yard	yd.	.31½
51½-inch 1.60-yard	yd.	.27⅛
51½-inch 1.90-yard	yd.	.23⅛

Hollands—White

Blue Seal

20-inch	yd.	.13½
30-inch		.24¾
40-inch		.27

Gold Seal

20-inch No. 72	yd.	.14½
30-inch No. 72		.25¾
40-inch No. 72		.29

Red Seal

20-inch	yd.	.12¼
30-inch		.22
40-inch		.24½

Osnaburgs

40-inch 2.34-yard	yd.	.15½
40-inch 2.48-yard		.14⅝
40-inch 2.56-yard S. F.		.14578
40-inch 3.00-yard		.12¾
40-inch 7-ounce part waste		.15
40-inch 10-ounce part waste		.21⅜
37-inch 2.42-yard clean		.15¼

Raincoat Fabrics

Cotton

Bombazine 64 x 60	yd.	....
Plaids 60 x 48		....
Surface prints 64 x 60		....
Print cloth, 38½-inch, 64 x 60		.08971

Sheetings, 40-inch

48 x 48, 2.50-yard	yd.	.16200
64 x 68, 3.15-yard		.13968
56 x 60, 3.60-yard		.11944
44 x 40, 4.25-yard		.09764

Sheetings, 36-inch

48 x 48, 5.00-yard	yd.	.08600
44 x 40, 6.15-yard		.06991

Tire Fabrics

Builder

17¾ ounce 60" 23/11 ply Karded peeler	lb.	.51

Chafer

14 ounce 60" 20/8 ply Karded peeler	lb.	.50
9¾ ounce 60" 10/2 ply Karded peeler	lb.	.50

Cord Fabrics

23/5/3 Karded peeler, 1⅜" cotton	lb.	.51
15/3/3 Karded peeler, 1⅛" cotton	lb.	.49
12/4/2 Karded peeler, 1⅜" cotton	lb.	.50
23/5/3 Karded peeler, 1¼" cotton	lb.	.51

Leno Breaker

8¾ ounce and 10¼ ounce 60" Karded peeler	lb.	.51

ACTIVITY in the July cotton market was influenced by uncertainty over the final disposition of the parity loan bill, anti-inflation moves, and other administration policies. Trading in the latter part of the month was dull; irregular early gains were offset by later losses. The price of the $^{15}/_{16}$-inch spot middling grade rose from 20.36¢ a pound on July 1 to 20.86¢ a pound on July 9, declined to 20.19¢ on July 22, and closed at 19.51¢ on August 3.

The Bureau of the Census reported cotton consumed in June totaled 966,940 bales, against 957,015 bales in May, and 875,812 bales in June, 1941. A daily rate of 43,950 bales consumed was indicated in the figures based on a five-day work week. The May rate was 45,600 bales. Cotton on hand June 30 was reported as follows: in consuming establishments, 2,441,130 bales, compared with 2,589,456 bales May 31 and 1,920,197 bales June 30, 1941; in public storage and at compresses, 8,458,912 bales, against 9,402,969 on May 31 and 10,574,730 on June 30, 1941.

The crop board of the Department of Agriculture reported 24,005,000 acres of cotton under cultivation July 1. To meet war needs the AAA planting allotment had been set at 27,400,000 acres. Department economists said that a 1931-1940 average on the 23,525,000 acres which the crop board estimated will be harvested would produce a crop of less than 10,000,000 bales. American cotton mills will need an estimated 12,000,000 bales for war needs. Officials pointed out that there is no danger of a shortage except possibly of long-staple types. The 10,000,000 bales of old cotton in storage consists in large part of low-grade and short-staple cotton unsuitable for war fabrics.

Amendment No. 1 to WPB Conservation Order M-117, and Conservation Order M-197, both issued July 22, placed domestic and foreign long-staple cotton under rigid limitations which will apparently restrict its use to military fabrics. Amendment No. 1 to M-117 refers to Egyptian cotton; M-197 to United States and Peru grown grades. Reserved cotton, imported into or ginned within this country prior to July 27, 1942, may be used only for filling defense orders or for manufacturing stitching thread. Use in such thread is limited to 75% of the rate of use in 1941. Reserved cotton imported into or ginned in the United States after July 27, 1942, may be used to fill orders placed on or before September 30, 1942, for incorporation into equipment for the armed forces or any corporation organized under the RFC. None may be used, sold, or delivered for other uses, except as authorized by the director of operations of the WPB.

Fabrics

The July fabrics market was quiet and tended to firm conditions. It appeared that many government agencies have filled their regular requirements for the balance of 1942. There was little demand for tire fabrics. Wholesale stocks of lightweight cotton fabrics for rubber goods manufacture are reported low as demand has continued to parallel production of such cloth. Seconds and shorts, when offered, are promptly taken. Mill orders for virtually all industrial cloths for delivery during the latter months of the year are expected to offset current production, and both producers and consumers appear reluctant to deal in goods for 1943 delivery.

A record 10½ billion linear yards of cotton fabrics over 12 inches in width were produced in 1941, the WPB and the OPA announced on June 29. Included in the total production were 327,679,000 yards of cotton duck; 2,132,122,000 yards of narrow sheetings; 3,548,933,000 yards of print cloth yarn fabrics; 202,281,000 yards woven tire fabrics; 8,676,000 pounds of covered rubber thread; and 114,605,000 pounds of tire cords. All these classes showed substantial increases over other years.

Interpretation No. 1 of General Preference Order M-91, issued July 13, by definition removed enameling duck from the restrictions of this order governing cotton ducks. Amendment No. 5 to General Maximum Price Regulation No. 118, issued July 7, placed specific maximum prices on wide industrial drills and print cloths. Prices for wide industrial print cloths represent a 17½% premium over narrow print cloths.

Tire fabrics are up 1¢ a pound. Few or no changes in prices were reported for other grades of fabrics.

Current Quotations

(Continued from page 512)

Stabilizers for Cure

Barium Stearate	lb.	$0.29	/$0.32
Calcium Stearate	lb.	.26	/ .27
Laurex (*bags*)	lb.	.1475/	.1725
Lead Stearate	lb.		
Magnesium Stearate	lb.	.29	/ .32
Stearex B	lb.	.1525/	.1625
Beads	lb.	.145	/ .155
Stearic acid, single pressed	lb.	.1525/	.1625
Stearite, *c.l.*	lb.	.1450	
Zinc Laurate	lb.	.29	/ .32
Stearate	lb.	.29	/ .31

Synthetic Rubber

Neoprene Latex Type 56	lb.	.30
57	lb.	.30
60	lb.	.36
Neoprene Type CG	lb.	.70
E	lb.	.65
FR	lb.	.75
G	lb.	.70
GN	lb.	.65
I	lb.	.70
KNR	lb.	.75
M	lb.	.65
Synthetic 100	lb.	.41
"Thiokol" Type "A"	lb.	.35
"FA"	lb.	.50
"RD"	lb.	.70

Tackifier

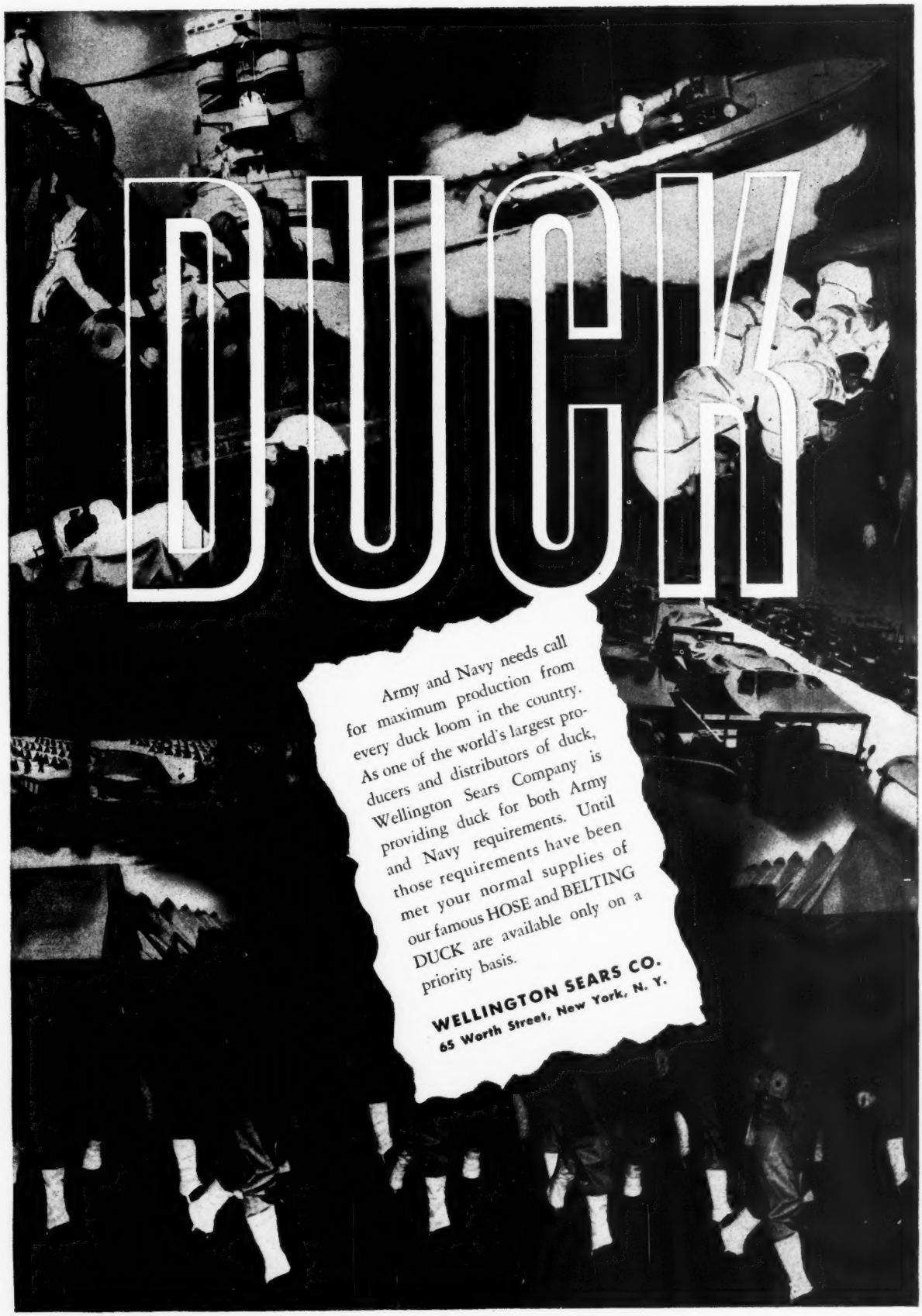
B.R.H. No. 2	lb.	02	/ .021
LX-433 (*tank car*)	lb.	.068	
P.H.O. (*drums*)	lb.	.24	

Vulcanizing Ingredients

Magnesia, light (for neoprene)	lb.	.26
Sulphur	100 lbs.	
Chloride (*drums*)	lb.	.04
Telloy	lb.	1.75
Vandex	lb.	1.75
(See also Colors—Antimony)		

Waxes

736 (clear)	gal.	1.25	
737 (black)	gal.	1.35	
1515-A (black)	gal.	1.35	
Carnauba, No. 3 chalky	lb.		
2 N.C.	lb.		
3 N.C.	lb.		
1 Yellow	lb.		
2	lb.		
Carnube	lb.	.46	/ .56
Monten	lb.	.12	/ .17
Rubber Wax No. 118, Neutral	gal.	.91	/ 1.46
Colors	gal.	1.01	/ 1.56


DUCK
Army and Navy needs call for maximum production from every duck loom in the country. As one of the world's largest producers and distributors of duck, Wellington Sears Company is providing duck for both Army and Navy requirements. Until those requirements have been met your normal supplies of our famous HOSE and BELTING DUCK are available only on a priority basis.
WELLINGTON SEARS CO.
65 Worth Street, New York, N. Y.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	May, 1942 Quantity	May, 1942 Value	Five Months Ended May, 1942 Quantity	Five Months Ended May, 1942 Value
UNMANUFACTURED				
Crude rubber, etc. lb.	.....	.....	.....	.....
Latex (dry weight) lb.	.....	.....	.....	.....
Gutta percha lb.	.....	.....	11,675	$ 9,598
Rubber, recovered lb.	2,828,700	$188,057	13,256,500	899,222
Rubber, powdered, and gutta percha scrap lb.	819,900	25,096	3,973,700	161,870
Balata lb.	20	10	35,130	18,195
Rubber substitute lb.	81,700	25,096	711,400	166,194
Totals	3,730,320	$238,259	17,988,405	$1,255,079
PARTLY MANUFACTURED				
Hard rubber comb blanks	.....	.....	.....	$ 375
Hard rubber, n. o. s. lb.	2,859	$ 2,717	12,533	10,784
Rubber thread not covered lb.	50	108	1,093	1,129
Totals	2,909	$ 2,825	13,626	$ 12,288
MANUFACTURED				
Bathing shoes prs.	.....	.....	2,905	$ 1,103
Belting	.....	$25,452	.....	104,446
Hose	.....	36,473	.....	135,782
Packing	.....	14,512	.....	66,199
Boots and shoes prs.	29	152	1,634	1,667
Canvas shoes with rubber soles prs.	.....	.....	14,640	4,394
Clothing, including waterproofed	.....	4,218	.....	11,933
Raincoats no.	6,266	36,805	20,887	166,360
Gloves doz. prs.	706	3,187	1,663	6,208
Hot water bottles	.....	2,444	.....	3,478
Liquid sealing compound	.....	6,809	.....	17,885
Tires, bicycle no.	187	247	1,192	1,118
Pneumatic no.	730	22,715	1,285	35,729
Solid for automobiles and motor trucks no.	87	7,684	222	15,756
Other solid tires no.	.....	1,787	.....	6,814
Inner tubes no.	549	3,285	955	7,290
Bicycle no.	324	171	1,320	511
Mats and matting	.....	9,018	.....	58,506
Cement	.....	30,983	.....	108,512
Golf balls doz. prs.	1	10	5,029	10,594
Heels prs.	2,204	174	32,386	3,252
Other rubber manufactures	.....	201,218	.....	963,712
Totals	.....	$407,344	.....	$1,731,249
Totals, rubber imports	.....	$648,428	.....	$2,998,616

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Crude rubber	.....	.....	.....	.....
Waste rubber	$ 21,483	.....	$ 72,617	.....
MANUFACTURED				
Belting	$ 18,194	.....	$ 64,150	.....
Bathing caps	.....	.....	136	.....
Canvas shoes with rubber soles	232	.....	44,458	.....
Boots and shoes	290,448	.....	1,021,993	.....
Clothing, including waterproofed	45,538	.....	120,518	.....
Heels	979	.....	4,595	.....
Hose	6,871	.....	50,258	.....
Soles	441	.....	1,833	.....
Soling slabs	.....	.....	39	.....
Tires, pneumatic	1,108,453	.....	5,603,604	.....
Not otherwise provided for	44,176	.....	289,320	.....
Inner tubes	86,649	.....	468,604	.....
Other rubber manufactures	8,179	.....	63,454	.....
Totals	$1,610,160	.....	$7,732,962	.....
Totals, rubber exports	$1,631,643	.....	$7,805,579	.....

INDIA

India is becoming ever more important to the United Nations as an Eastern source of raw and finished goods. Already modifications of shellac, rubber, and casein have been utilized on a large scale, and in addition useful plastics have been made from such materials as ground-nut seed cake, coffee beans, mohwa seed cake, bagasse and jute waste.

A south Indian cactus is reported to have been found which has various possibilities, yielding, among others, a rubbery product having most of the properties of latex; a high-melting point wax, 120° C.; a low-melting-point wax, 50° C.; capable of being raised to about 100° C. by simple chemical action; and resins and plastic materials that yield excellent molding powders.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

PRACTICAL RUBBER CHEMIST, 14 YEARS' EXPERIENCE COMpounding and processing for tires, mechanical and proofed goods, involving natural rubber and all synthetics. Also experienced with latex, airfoam sponge, and dipped goods. Ph.D. Have held supervisory positions. Location immaterial. Address Box No. 449, care of INDIA RUBBER WORLD.

CHEMIST, EXPERIENCED RESEARCH AND DEVELOPMENT, natural and synthetic rubber insulation, wants responsible position. Married, dependents. Salary $350 per month. Address Box No. 461, care of INDIA RUBBER WORLD.

PRODUCTION ENGINEER DESIRES CHANGE. EMPLOYED AS such at present. Qualified by 20 years' of broad experience to estimate costs, plan processes, and supervise manufacturing of mechanical, sponge, and synthetic rubber products. Especially competent in manufacturing products from reclaimed rubber. Position as technical superintendent desirable. Address Box No. 464, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

CHEMIST — EXTENSIVE MECHANICAL GOODS, SOFT OR hard rubber experience. Reply all details first letter. Address Box No. 450, care of INDIA RUBBER WORLD.

TIRE AND TUBE ENGINEER—THOROUGHLY EXPERIENCED in layout, construction, development, and estimating. Good opportunity with old-established organization. Address Box No. 451, care of INDIA RUBBER WORLD.

SALES REPRESENTATIVE WANTED. WELL INTRODUCED IN industries engaged in war work, for subcontracting of rubber parts. Address Box No. 454, care of INDIA RUBBER WORLD.

RUBBER CHEMIST — DEFENSE WORK. EXTENSIVE EXPERIence soft rubber, compounding, calendering, spreading and molding. Give all details first letter. Address Box No. 455, care of INDIA RUBBER WORLD.

RESIN CHEMIST. A MAN WITH GRADUATE STUDY, EXPERIenced in polymerization processes wanted. Should be acquainted with the chemistry of synthetic rubber and synthetic resin manufacture. Good salary commensurate with experience and training. Eastern location with established resin manufacturer. Address Box No. 456, care of INDIA RUBBER WORLD.

RUBBER CHEMIST. RECENT GRADUATE WANTED WITH major in chemistry or chemical engineering. Experience in compounding rubber latex necessary. Good salary. Eastern location with firm carrying program of research on synthetic latices. Address Box No. 457, care of INDIA RUBBER WORLD.

SITUATIONS OPEN *(Continued)*

RUBBER CHEMIST
and
PRODUCTION CONTROL MAN

Molded rubber and synthetic rubber. Excellent opportunity. Steady employment. Vicinity of Philadelphia. Must be U. S. citizen with deferment. Give full details in first letter. Address G-23, Post Office Box 3414, Phila., Pa.

EXPERIENCED GUTTA-PERCHA CALENDER MAN. REPLY IN detail. Address Box No. 459, care of INDIA RUBBER WORLD.

TIRE CONSTRUCTION ENGINEER—RESPONSIBLE FOR LAYout, development, construction and specifications. Replies should give details of experience and personal data. Address Box No. 465, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITY

WANTED TO LEASE WITH OPTION TO BUY, MEDIUM-SIZE plant ready to start immediate production special molded rubber items, located within 150 miles of New York. Address Box No. 452, care of INDIA RUBBER WORLD.

MISCELLANEOUS

RUBBER SUBSTITUTE WANTED TO PRODUCE A FLEXIBLE OR partially-flexible and non-toxic finished product. Permission to manufacture under license probably required. LEWIS WOOLF LTD., 144, Oakfield Road, Birmingham, 29, England.

WANTED: ONE COMPLETE SET OF *VANDERBILT NEWS*, VOL. 1-11 inclusive (1931 through 1941); also the first three volumes of *Vanderbilt News*, 1931-1932, 1933. Will consider purchase of individual volumes or lots less than complete sets. Address Box No. 463, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—Southwark 1000-Ton Hydraulic Press, 24" dia. ram, complete with horizontal Hydraulic Pump and motor; 1—W.S. Hydro-Pneumatic Accumulator 2500 PSI, 8 gal., with IR m.d. compressor; 1—Rotary Cutter, ball bearings, similar to #2 Ball & Jewell; 2—24"×24" Hydraulic Presses, ram 12" dia.; 1—W.S. 15"×18" Hyd. Press, 6" dia. ram, 4" posts; 6—Semi-Automatic Hydraulic Molding Presses; 1—Farrel-Birmingham 16"×36" Rubber Mill; Adamson 6" Tuber; 7—W.&P. Mixers; Dry Mixers, Pulverizers, Grinders, Tubers, Hydraulic Pumps, Calenders, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: 1—NO. 20 BANBURY MIXER; W. & P. MIXERS, LAB. to 200 gal.; 3—Vacuum Shelf Driers; 6—Preforming Machines; 7—Change Can Mixers, 8 to 80 gals. Your inquiries solicited. BRILL EQUIPMENT CORPORATION, 183 Varick Street, New York, N. Y.

1—TIRE VULCANIZER, 60" DIA. BY 12'; 4—4'×12' VULCANIZERS; 1—4'×12' Vulcanizer with quick-opening door; 1—#55 Taylor-Stiles Scrap Rubber Cutter; 1—9" Alligator-type Shear; 4—40" Mills; 1—10" Strainer; 4—7" Strainers; 2—Embossing Calenders. Address Box No. 458, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES WANTED

WANTED: NO. 2 OR NO. 3 ROYLE PERFECTED TUBER OR equivalent in good condition, also laboratory equipment and testing devices. Address Box No. 453, care of INDIA RUBBER WORLD.

WANTED: BASKETBALL, SOFTBALL SHOE SOLE MOLDS; rubber thread cutting machine. O. Rivkin, 6809 N. Wolcott Ave., Chicago, Illinois.

WANTED: LABORATORY 2-ROLL MILL. ADDRESS BOX NO. 460, CARE OF INDIA RUBBER WORLD.

WANTED: Banbury Mixer, Mills, Calender, Hydraulic Presses, with pump and accumulator, Tubers. Any Condition. Address Box No. 462, care of INDIA RUBBER WORLD.

INDEX TO ADVERTISERS

This index is maintained for the convenience of our readers. It is not a part of the advertisers' contract, and India Rubber World *assumes no responsibility to advertisers for its correctness.*

One-Third Actual Size

★ This poster, sent on request to Scrap Rubber Dealers by A. Schulman Inc., is designed to help dig out more Scrap for our armed forces. The Scrap Rubber Organization is striving to fulfill the Government's request for every available ounce, so vitally important in America's Fight for Freedom.

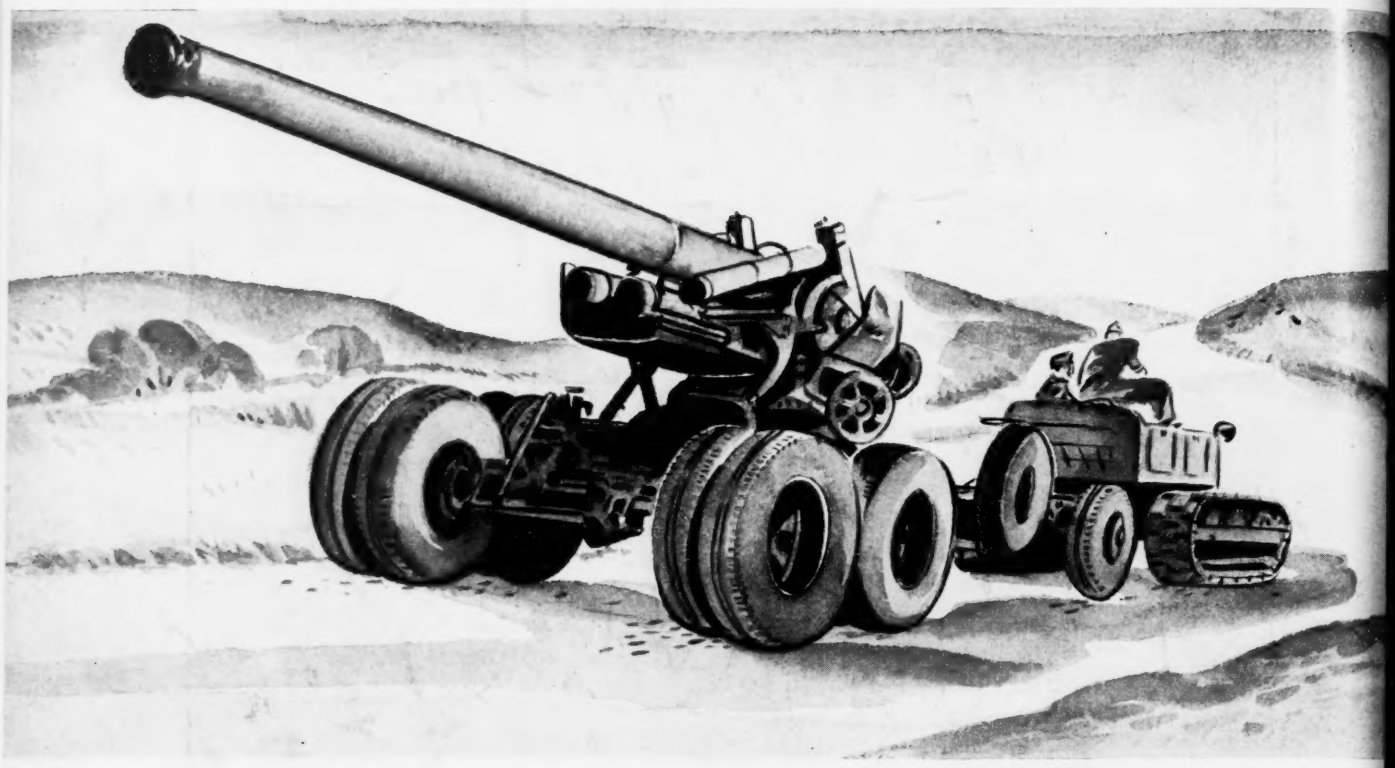
A. SCHULMAN Inc.

Authorized Agents for Rubber Reserve Co.

SCRAP RUBBER

AKRON, OHIO—E. ST. LOUIS, ILL.—BOSTON, MASS.—VERNON, CAL.

OUR ARMED FORCES ROLL ON RUBBER



KEEP YOUR PRODUCTION *Rolling*

with **CLIMCO PROCESSED LINERS**

★ With Climco Processed Liners on the job, production at the cutting table flows smoothly and without interruption. Climco Processing prevents stock adhesions. This means no time is wasted in repairing cut or torn liners, or in rerolling for cooling. Climco Processing also saves the time consumed in brushing and cleaning the liners. It eliminates lint and ravellings. ★ By solving these problems, Climco Processing not only speeds production, it also causes a corresponding reduction in labor and power costs. ★ For years many companies have gained these benefits by having their liners Climco Processed. Now that production schedules are tougher than ever before, you should give Climco Processing a trial in your plant.

CLIMCO

LINERETTE
INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

THE CLEVELAND LINER & MFG. CO.
Cleveland, Ohio

CLIMCO PROCESSED LINERS
For Faster, Better Production at Lower Cost